1986
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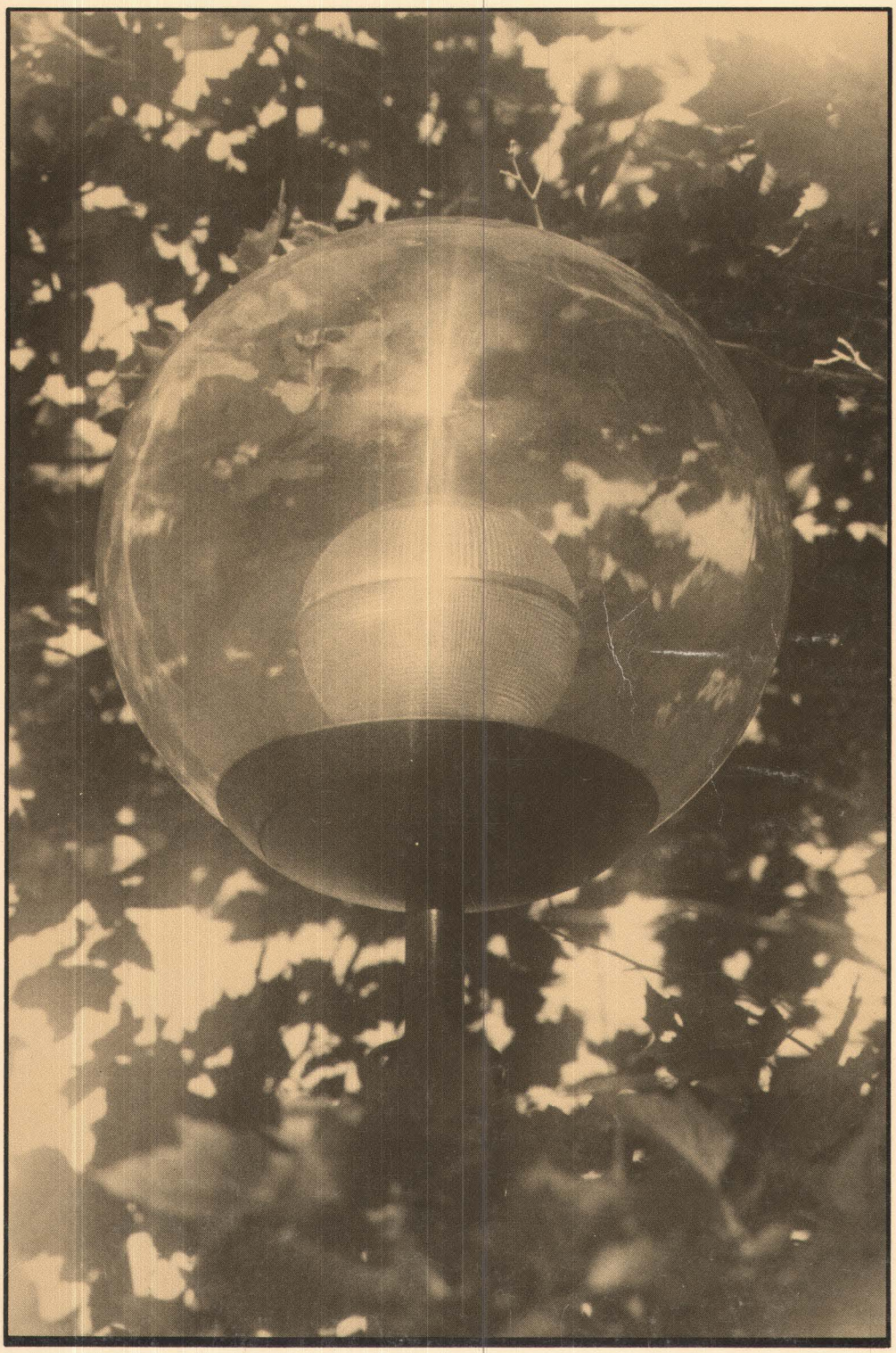
Graduate Bulletin



STATE UNIVERSITY OF NEW YORK AT **StonyBrook**

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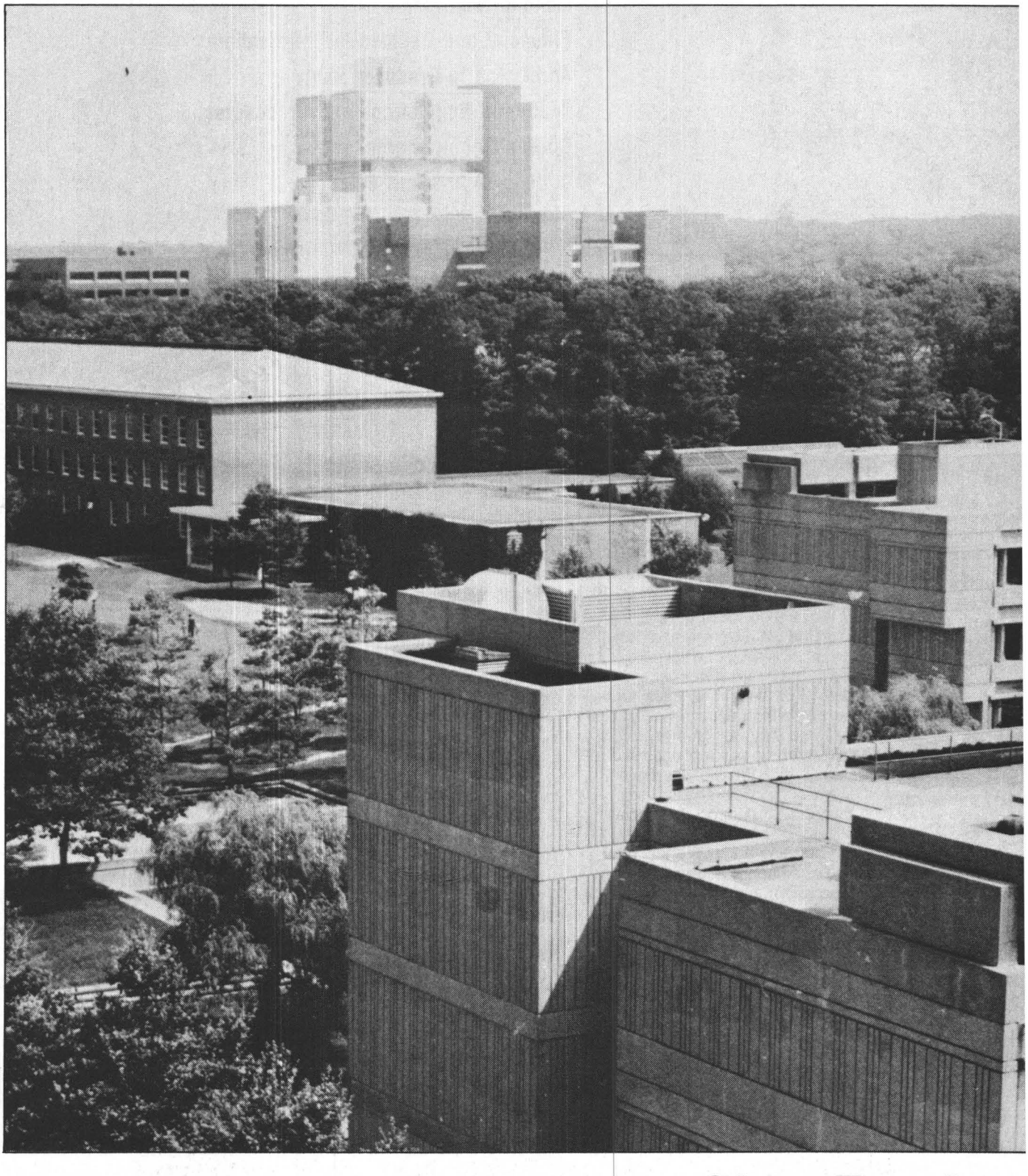


STATE UNIVERSITY OF NEW YORK AT StonyBrook

Graduate Bulletin
Volume XIX

Press Date: February 1, 1986

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 Circumstances may require that a given course be withdrawn, or that alternative offerings be made.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.

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
(516) 632-7040

Contents

Cover photo: Tom Giacalone

Photos by Tom Giacalone, Maxine Hicks, Pat Greenberg, HSC Photography Service, Marine Sciences Research Center, Lou Manna, Tom Bell, Franz Edson, and Edgar Buonagurio

Page 38: "Secrets (Visions of the Putti)" ceramic sculpture by Toby Buonagurio, Associate Professor of Art

Equal Opportunity and Affirmative Action

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

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 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
Telephone: (516)632-6280

The Meaning of Graduate Education

The decision as to whether an individual should pursue formal education beyond the baccalaureate level is an extremely important one, and it is essential that the distinctions between undergraduate education and graduate and professional studies be clearly understood by those in the process of examining their career options.

Undergraduate education should provide students with a broad overview of the scope of human knowledge, assistance with the development of life goals and philosophy, and a more detailed look at one or more chosen disciplines. The undergraduate rarely is able to gain more than a rushed glance at the underpinnings of the field he or she has chosen as a major, and though this may be sufficient for beginning a productive and challenging career, it is rarely adequate to permit the individual to achieve the satisfaction of becoming a true leader in advancing the frontiers of the discipline in a short period of time.

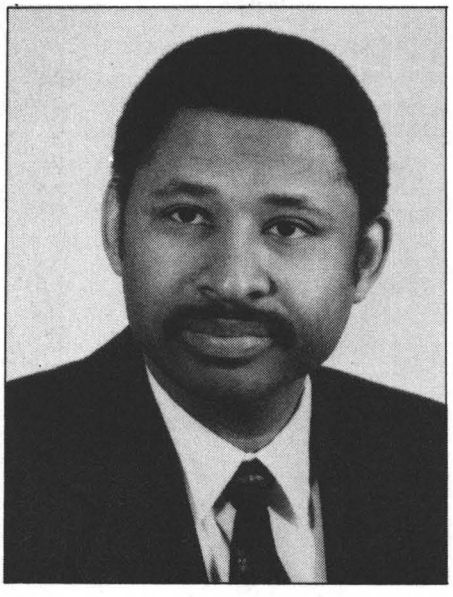
Like undergraduate education, graduate education should also support the continued broad educational development of the student but it, uniquely, requires the student to determine the very limits of knowledge in his or her specialty and then challenges the student to go beyond those limits. In the process of doing this one not only becomes aware of all that is known about an issue and what strategies should be employed to advance the respective field, but it also develops within the student a highly refined sense of scholarship and inquiry, attributes that are essential in dealing with all scholarly matters and, indeed, in life.

Research and graduate education are distinguishing features of our University. Though our campus is less than 30 years old, many of our departments rank among the very top in the nation. Fine programs exist in each of our colleges and divisions. Faculty of international stature, in close collaboration with graduate students, conduct their scholarly inquiry using well-equipped laboratories, extensive library facilities, and an advanced computing environment. Unique opportunities are available for our students to participate in frontier research sponsored by federal agencies, private foundations and industry. Indeed, such opportunities are expanding at a prodigious rate since, according to a recent study, our campus has the second most rapidly growing research funding volume of all universities in the country. Moreover, students in fields such as the humanities and arts and the social sciences, where sponsored support is not as necessary for the conduct of frontier inquiry, will find other unusual opportunities to work with scholars and artists who are world leaders in their respective areas.

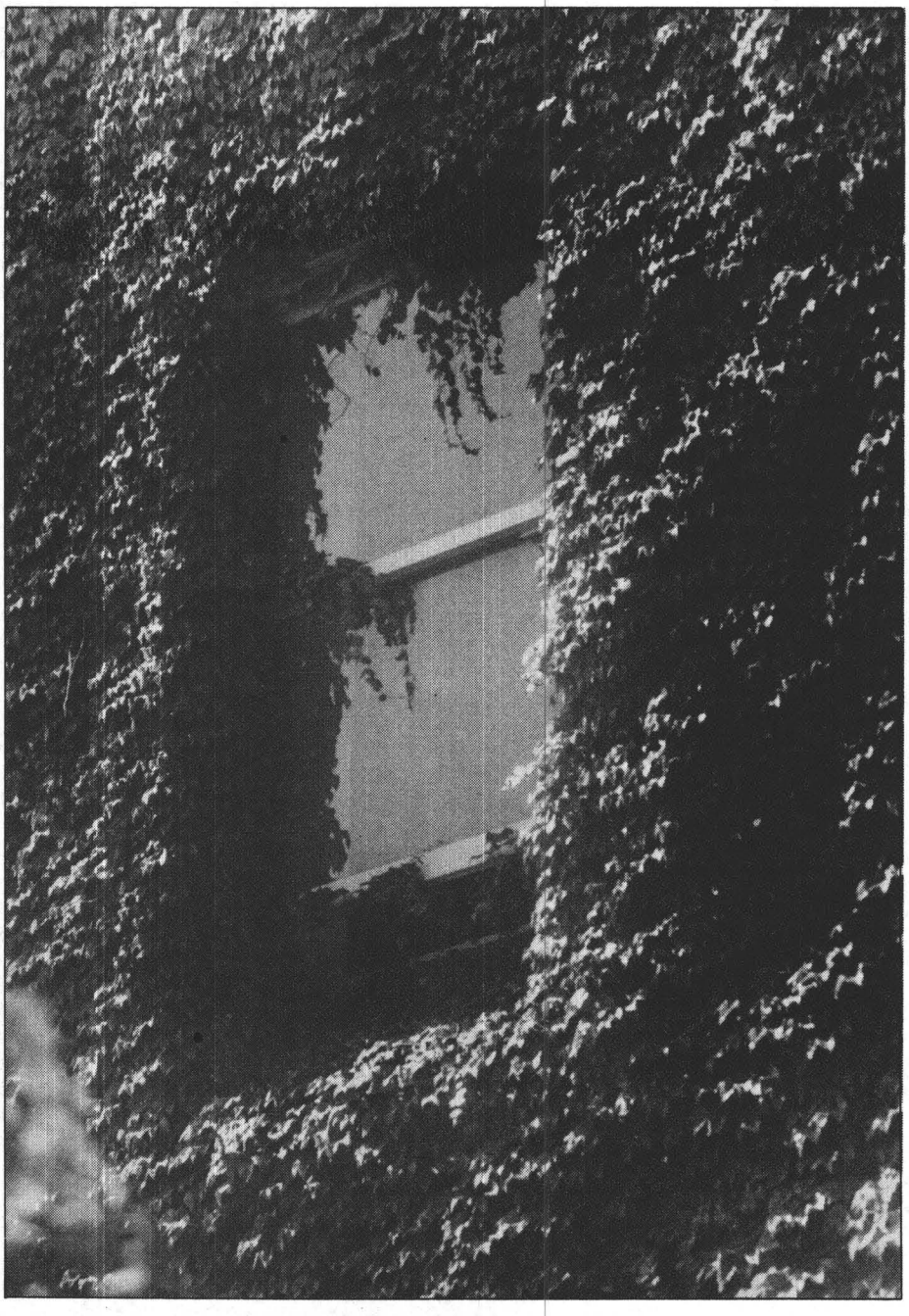
I wish to urge each of you who are now nearing the completion of your undergraduate study to give serious consideration to pursuing advanced studies. This suggestion also applies to those of you who have been in the workplace for a few years and are now contemplating options for significantly advancing your career. Graduate education will enhance your ability to contribute to the development of society and to achieve your life goals. Unless our nation is able to convince more of its citizenry to pursue graduate education, particularly females and members of minority groups who are greatly underrepresented in many key fields, we foresee serious shortages in numerous disciplines in the years ahead, with inadequate numbers of highly trained individuals being available to meet critical needs. But the needs in graduate education are much more than meeting human resource needs. Of much more importance is the opportunity it provides for talented individuals to have the fulfillment of knowing that, whatever their ultimate endeavor might be, they are contributing to the true advance of knowledge and improvement of society at the very limits of ability.

With all best wishes.

Homer A. Neal
Provost, 1981-86



General Information



Background

Established 30 years ago in 1957, the State University of New York at Stony Brook achieved national stature in a generation. Stony Brook offers excellent programs in a broad spectrum of academic subjects, and conducts major research and public service projects. Over the past decade Stony Brook has had one of the fastest growing externally funded research programs in American universities. Internationally renowned faculty members offer courses from the undergraduate to the doctoral level for 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 at Oyster Bay, Long Island as a State University College to prepare secondary school teachers of mathematics and science, the young school moved with its broadened mandate 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 1300, the student body from 1000 to 16,000 and the annual operating budget from about $3 million to over $400 million.

One of Long Island's largest employers, the University serves this complex, growing region through research into area problems; through cooperative programs with governmental agencies at the federal, state and local levels; and by responding to the region's extraordinary demand for higher education opportunity. 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 environmental sciences and the arts.

Location

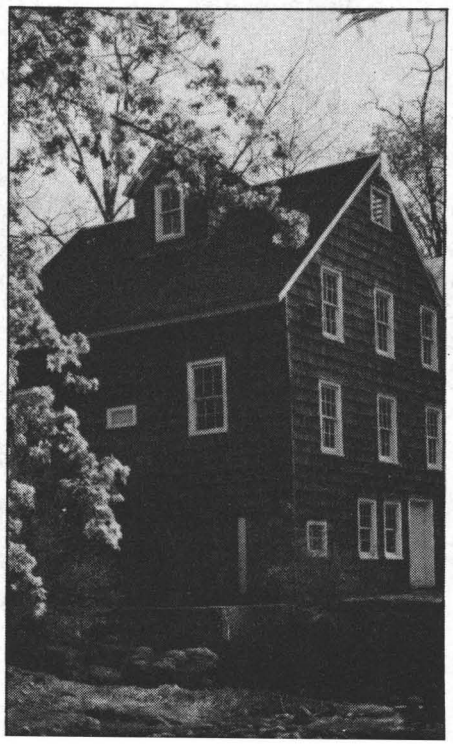
Stony Brook is located about 60 miles east of Manhattan on the wooded north shore of Long Island, convenient to New York City's cultural life and Suffolk County's tranquil, recreational countryside and seashores. The internationally recognized research facilities of Brookhaven National Laboratory and the Cold Spring Harbor Laboratory are not far away. 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 Sound and 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.

Campus

Stony Brook's bustling academic community is situated amid 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.

Surrounding the Frank Melville, Jr. Memorial Library at the center of the campus (see map at the back of this book) are the major academic buildings for arts and sciences and engineering, the Van de Graaff nuclear accelerator, the Administration Building, Lecture Center, Laboratory-Office Building, Educational Communications Center, Computing Center, Stony Brook Union, Gymnasium and other service and activities buildings. Stony Brook's Fine Arts Center provides superb performing arts facilities and houses the Departments of Theatre Arts, Music and Art. A large outdoor plaza in which concerts may be held connects the Library, Stony Brook Union and Fine Arts Center in the middle of the campus. A new fieldhouse is scheduled to be under construction by late 1986.

Encircling the academic buildings are six residential quadrangles with living space for 1,000 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 co-educational "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. Preliminary authority has been granted for the construction of additional dental medicine facilities in this area.

The architecturally striking Health Sciences Center comprises academic and support areas for five schools and University Hospital, a 540-bed facility that admitted its first patients in 1980.

Parking is available for 9,100 cars, including a 2,000 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.

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 7,000 people (full-time and part-time) on a campus payroll that exceeds $100,000,000 annually, Stony Brook is Long Island's fifth 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 Long Island's major research university and source of advanced and specialized instruction, Stony Brook provides a social and cultural center for Long Island, a specialized referral center for health care, 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, theatre 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 avail-

able 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 also provide expertise and services to help solve problems. The Economic Research Bureau provides applied economic analysis and forecasting for regional and statewide planning. 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 pursuing specific objectives or seeking personal enrichment. Hundreds of 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 University Hospital Auxiliary and the Stony Brook Foundation.

Special Centers and Institutes

The University is home to many centers, laboratories and institutes. Among them are: the Arms Control and Peace Studies Center, Bach Aria Festival and Institute, Center for Biotechnology, Center for Industrial Cooperation, Center for Italian Studies, Center for Religious Studies, Center for Science, Mathematics Technology Education, Economic Research Bureau, Educational Communications Center, Empire State College.

Also, the Institute for Mental Health Research, Institute for Technology Policy in Development, Institute for Theoretical Physics, Institute for Urban Sciences Research, Institute of American Studies, International Art of Jazz, Laboratory for Arthritis and Related Diseases, Laboratory for Behavioral Research, Laboratory for Experimental Mechanics Research, Laboratory for Personal Computers in Education, Laboratory for Planetary Atmospheres Research, Long Island Regional Advisory Council on Higher Education.

Also, the Museum Computer Network, National Coordinating Center for Curriculum Development, N.Y. State Center for Assessing Health Services, Research Center for Health Promotion/Disease Prevention, Research Group for Human Development and Educational Policy, Stony Brook Radiation Laboratory, Sudden Infant Death Syndrome Information and Counseling Center and Taproot Workshops, Inc.

Degree Opportunities

Graduate study is offered in 43 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 22 areas, and the M.S. in 11 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. 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.

Center for Continuing Education

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 (GSP = graduate special student) 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.

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, telephone (516) 632-7050.

Students

Stony Brook's current enrollment is about 16,000 students. Graduate students number 4,600 (2,700 full-time, 1,900 part-time) while undergraduate students number 11,400 (10,200 full-time, 1,200 part-time). Graduate students come from all states in the nation and from some 75 countries of the world. Foreign students, both graduate and undergraduate, represent about seven percent of the total student body.

Stony Brook is committed to ensuring educational opportunity at the undergraduate, graduate and professional levels to students from groups which historically have not been equally represented in higher education, for example, ethnic minorities and women. The University recognizes its responsibilities to develop leaders among these groups and values the contribution to the educational environment made by a diverse student population.

Faculty

The vast majority of Stony Brook's 1,280 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 Lewis Thomas, former Chancellor of Memorial Sloan-Kettering Cancer Center; Distinguished Professor Charles Rosen in Music; Distinguished Teaching Professors John Truxal in Engineering, Norman Goodman in Sociology and Elof Carlson in Biological Sciences; Pulitzer Prize-winning poet Louis Simpson in English; poet-playwright Amiri Baraka; poet-essayist June Jordan; and author Thomas Flanagan, winner of a National Book Critics Circle Award for "The Year of the French." Stony Brook's distinguished faculty is also proud to include ten members of the American 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 and post-graduate education, with which scholarly effort is closely coupled. 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 as employees on externally funded projects. Some receive fellowship or traineeship support from such sources. In 1966, the Board of Trustees of SUNY 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 the next two fiscal years, Stony Brook's sponsored project expenditures are expected to grow from the $50 million recorded in 1985 to over $60 million. The bulk of these funds (over 80 percent) derive from grants and contracts with the federal government. The remaining funds come from private foundations, non-federal governments, voluntary health agencies and industrial organizations. Over 900 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 programmatic 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. The Office of Research Administration also coordinates the filing of patents which derive from the use of University facilities. Students are urged to discuss any agreements involving their research activities in which they are named, or which they may be asked to execute with external organizations, with this Office.

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.

All projects requiring the use of animals, recombinant DNA, radioactive materials or ionizing radiation, or lasers 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.

The campus offices which deal with research and scholarly effort recognize the importance of these activities to the University. They stand ready to help and advise on most aspects of these essential missions.

Academic Journals

Academic publications edited or published at the University include: *Advances in Learning and Behavioral Disabilities, Anthropology, Art Criticism, Ascent, Biological Psychiatry, Bulletin of Research in the Humanities, Circuits, Systems, and Signal Processing, Developmental Review, Gastrointestinal Radiology, Gradiva, Heat Transfer—Japanese Research, Journal of College Science Teaching, Journal of Educational Technology Systems, Journal of Histotechnology, Journal of Neurophysiology, Journal of Urban Analysis, Materials Letters, Materials Science and Engineering, Medieval Prosopography, Mental Retardation & Developmental Disabilities, Physics and Chemistry of Minerals, The Physics Teacher, Previews of Heat and Mass Transfer, Proceedings of the American Mathematics Society, Quarterly Review of Biology, Quintessence of Dental Technology, Slavic and Eastern European Arts, Socio-Economic Planning Science,* 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 1.5 million bound volumes and 2.3 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 midnight.

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

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

Computing Center

Stony Brook is in the midst of a major upgrade to its computing equipment. Administrative needs are currently met by a Sperry 1100/62 with eight million characters of main memory and five billion of disk storage. Large scale research and instructional needs have been met by a Sperry 1100/82 with 12 million characters of main memory and 10 billion of disk storage. The two devices share two high-speed printers and three remote printers.

An IBM 3083JX with 32 million characters of main memory and 20 billion of disk storage has recently been installed to begin the transition to new systems. This system includes the new cartridge tape drives, two high-speed printers and conventional tape drives. Accompanying it is a Xerox 8700 laser printing system.

An extensive array of software is supported on these systems. Consulting services are available to aid with the use of the software. Accounts are readily available to all faculty and students.

Over 150 terminals are available in public sites for general access as well as dozens of dial-in connections. 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 itself 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.

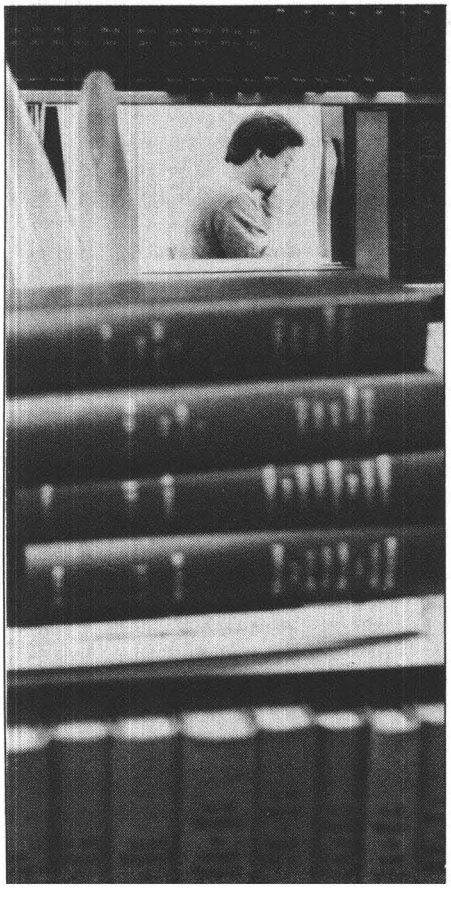
The Center also supports a microcomputer lab which offers a wide array of software and hardware with appropriate consultation, for those who may be interested in purchasing their own systems. Discount purchases are available through the Research Foundation.

In addition there is a VAX 8600 which runs the All-in-1 software for campuswide electronic mail and file transfer. Time is available also for research work.

Student Life

A wide variety of lectures, seminars, concerts, exhibits, theatrical performances, movies, and sporting events are scheduled regularly during the academic year. Some recent well-known speakers at Stony Brook have included authors James Baldwin, Carlos Fuentes and Umberto Eco; newscaster Bettina Gregory; human rights leaders Elie Wiesel, Julian Bond and Andrew Young, and minister William Sloane Coffin.

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; usually 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 recognized as the most important performing arts center in Suffolk County. It includes one 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.

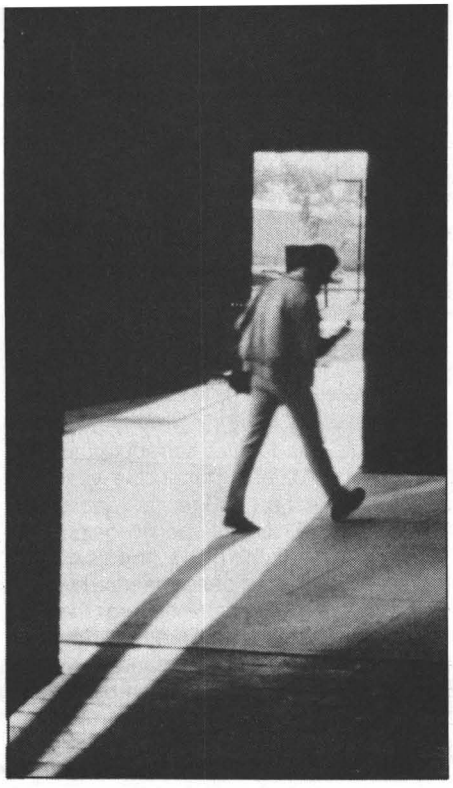
The Fine Arts Center schedules more than 50 major events during the year. In addition, more than 200 recitals and concerts are given which are open to the public with no admission charge. Highlights of the past season included performances by the Dance Theatre of Harlem, Pittsburgh Ballet, Vienna Choir Boys and the Philharmonia Hungarica, as well as performances by the Stony Brook Concert Band, Chamber Symphony and Symphony Orchestras, Chamber Singers, Gospel Choir, and University Chorus and productions by the Department of Theatre Arts, University Theatre.

In addition to 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) and the Eastern Collegiate Athletic Association (ECAC). During 1985 two ECAC championships were won by Stony Brook teams, lacrosses in the spring and men's cross country in the fall. In addition, the women's track team produced four All Americans and the men's swimming team one, while All American honorable mention recognition was given to one lacrosse player and two football players.

The campus student newspaper, *Statesman,* is published twice 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; *Soundings,* a literary magazine; and *Specula,* the campus yearbook.

Campus ministries serve student religious concerns through the Interfaith



Center. Chaplaincies represent the Jewish, Protestant, Southern Baptist, Roman Catholic, Unitarian Universalist, and Church of Christ traditions. Services, activities, and counsel are open to all. The Catholic Ministry offers religious and social services in a "parish" atmosphere. The Protestant Campus Ministry at Stony Brook is the ministry of five Protestant denominations in the Stony Brook area (Episcopal, United Methodist, Reformed, Presbyterian, and United Lutheran) and is the regional ministry of L.I. United Campus Ministries, Inc. The Protestant chaplain offers a ministry of worship services, counselling, programs, social action, and retreats. The B'nai B'rith Hillel Foundation offers a broad range of cultural, religious, and social activities for the campus Jewish community. It provides for various group activities, counselling, and supervision of the Kosher meal plan.

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.

Honor Societies

At Stony Brook, local chapters of national honor 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 Stony Brook Chapter of Alpha Eta (allied health professions), Phi Chapter of *Alpha Kappa Delta* (sociology), Stony Brook Chapter of Alpha Omega Alpha (medicine), 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).

Graduate Student Organization

The Graduate Student Organization (G.S.O.) is composed of all students enrolled in graduate programs at Stony Brook, including the Center for Continuing Education and the Health Sciences Center. The G.S.O. operates a housing service and a part-time job service. Several active committees work on helping to solve problems facing graduate students. The Senate, representing all departments, oversees the spending of the mandatory student activity fee on campus social, cultural, athletic, and public service events.

All graduate students are welcome to help coordinate on-going activities. The G.S.O. office is located in room 128 of the Old Chemistry Building.

Stony Brook Union

The Stony Brook Union is the campus center for social, recreational and cultural activities. 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 television. You can take a craft or photography course, 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 10 meeting and conference rooms. The auditorium seats 365, and the ballroom can accommodate up to 600. The Art Gallery displays the works of campus and community artists, and is open weekdays for browsing.

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

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 (516)632-6830. 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 (516)632-6830.

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, 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, 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.

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

The major student publications (*Statesman,* the student newspaper; *Specula,* the yearbook; *Black World*), 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 (516)632-6830, or the Union Director's Office at (516)632-6820.

Hours of Operation

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

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 (516)632-6830.

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. The playing fields have recently been extensively rehabilitated. Construction of a new fieldhouse is scheduled to begin in 1986.

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.

Student Services

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 accompanying them.

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 in which students are helped by career counselors to relate their academic abilities and interests to career opportunities is open to all.

An on-campus recruitment program permits interested seniors and graduate students to meet with prospective employers and graduate schools. A permanent credentials service is provided to support students in their application for jobs or advanced study.

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 in 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 3 p.m.

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.

Counseling Center

The University Counseling Center, located on the second floor of the Infirmary, provides individual, group, family and marital counseling and psychotherapy for students experiencing psychological difficulties. The Center also offers programs for personal growth and enrichment. For information, please call the Center at (516)632-6725.

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, recreation, registration and advisement, 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 (516) 632-6749. An early start will permit the evaluation of possible problems and will provide time to work out solutions.

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 university students.

Foreign Student Services

The Office of Foreign Student Services 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. The Director of the Office of Foreign Student Services reports to the Dean for International Programs.

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 a.m.-6 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 and gynecological problems are also available.

Veterans Affairs

The Office of Veterans Affairs, operating within the Division of Career and Developmental Services, offers counseling and advisement to veterans and eligible dependents of veterans. Students are provided with information and assistance in preparing applications for V.A. educational benefits and other financial aid programs for veterans and dependents of veterans.

As part of its outreach efforts, the office publishes a newsletter which includes information on: legislation affecting veterans, changes in V.A. rules and regulations, new programs and services, and other issues of interest to veterans. In addition, a resource collection containing information on a wide variety of topics concerning veterans is available to interested individuals visiting the office.

Students seeking information and assistance are encouraged to contact the Office of Veterans Affairs as soon as possible. The Office is located in Room 155, Central Hall. Office hours are: Monday, Tuesday and Friday, 1-5 p.m., and Wednesday and Thursday, 8:30 a.m.-12:30 p.m.

Policies and Procedures

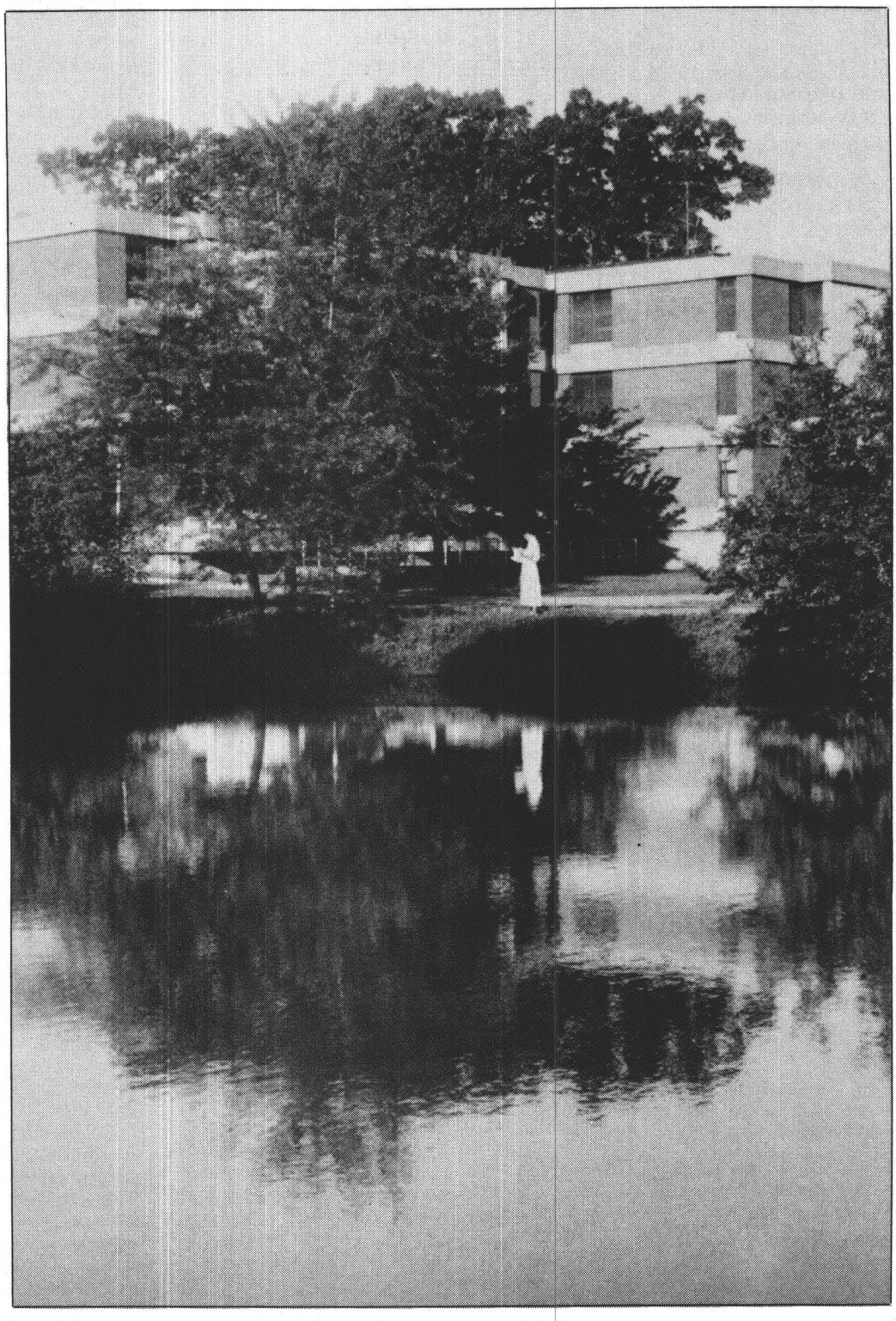
Telephone Directory

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.

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.

Financial and Residential Information



Financial Information

Tuition and Fees

Charges are due and payable by the first day of classes unless properly deferred. *All fees and charges are subject to change without further notice.*

Application Fee			$35.00
Tuition	First Semester	Second Semester	Year
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	156.00	156.00	
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	875.00	875.00	1750.00
Board			*Fee to be announced*
Activity Fee			
Full-time students, except professional	16.10	16.10	32.20
Part-time students	4.00	4.00	8.00
Cooking Fee[2] (Residents not on Board Plan)			
Halls	155.00	155.00	310.00
Suites	100.00	100.00	200.00
Lost Identification Card			10.00
Late Registration Fee[3]			20.00
Transcript Fee			Each 3.00
Returned Check Charge			5.00
Late Payment Fee			20.00
Add/Drop Fee			10.00

[1] *Applied to first semester housing charges: apartment complex deposit is $100.00.*
[2] *Does not apply to the apartment complex.*
[3] *Paid by students registering after the close of the official registration.*

Payment

Tuition and fees for a given academic session must be paid in full or properly deferred prior to the first day of classes. All checks should be payable to SUNY at Stony Brook. Post-dated checks are not acceptable. Visa or Master Card payments may be made in person or by mail. Mail payments must include an Authorization for Use of Visa/Master Card form. Mail payments should be sent to P.O. Box 619 Stony Brook, NY 11790. Students with approved tuition waivers, room waiver or activity fee waiver forms must submit those forms in lieu of payment by the end of late registration. Graduate teaching assistant tuition waivers may be reduced by the amount of the Tuition Assistance Program Award (TAP). Graduate students eligible for TAP must apply and bring award certificate to the Student Accounts Office, even if the award is zero. Failure to apply may result in tuition liability incurred by the student.

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.

Schedule of Tuition Liability

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

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

Please note that 0% liability will be in effect for the first week of classes *only.* Students who do not attend any classes *and* properly notify the University of their intent to cancel registration by the end of the first week of liability in accordance with the above schedule shall be deemed to have cancelled registration in its entirety. Students who cancel/withdraw after the first week of classes shall be liable according to the liability schedule above. Non-attendance *does not* constitute the cancellation of registration or financial charges.

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 with-

drawal 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.

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 1986 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 current hours of operation.

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 $100 to $155 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 $600 for nine months (September- May). This figure is included in the basic student aid budget.

Miscellaneous Expenses

The average estimated personal expense is $1000 for nine months. This figure is used for the basic student aid budget.

Travel Expenses

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

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.

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 P.O. Box 619, Stony Brook, N.Y. 11790. 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. When satisfying financial obligations, cash, bank check, or money order is accepted. Personal checks will take two weeks to clear before release of transcripts.

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 certification from the Higher Education Services Corporation prior to the beginning of classes in the fall. Students are reminded that failure to file an application in a timely manner can preclude their receiving award credit or deferment.)

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

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

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

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

Award Certificate from the Veterans Administration to the Bursar's Office.

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

5. University Employment: Graduate students employed as teaching assistants, graduate assistants or research assistants may defer charges up to one-half of their semester stipend. Only tuition, room and board charges may be deferred. All deferments expire six (6) weeks after the first day of classes and must be supported by a notarized power-of-attorney and deferment form. If the balance has not been paid by the assigned due date, the student is subject to a $20.00 late payment fee. In addition, the student's check will be applied to any outstanding balance.

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 withdrawals must be effected during the Monday through Friday office working hours.)

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.* Chapin Complex residents will be held financially responsible for their entire agreement period unless the complex is able to relet their space. Refund requests for room payment must be accompanied by verification of the move-out date by the University Office of Residence Life. Cooking fee will be refundable if the student has enrolled in the Meal Plan within two weeks after checking into the residence hall. The amount of such refund is to be determined by University policy in effect at the time.

Refund of Student Activity Fee

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

Meal Plan Refunds

Meal Plan refund requests must be made in writing to the Office of Student Accounts, Administration Building, State University of New York at Stony Brook, Stony Brook, NY 11794-0501.

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.

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, grants and loans. *The awards described below are available only to full-time matriculated students* through the Graduate School or the Office of Financial Aid and Student Employment, 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. 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 1986 will not exceed a set limit ($8514) for the academic year. If a student receives tuition assistance from an outside source, the maximum tuition waiver available will be limited to the unpaid portion of the tuition.

Federal Academic Progress Standards

Regulations require that students demonstrate reasonable academic progress to remain eligible for Title IV student financial aid, i.e., they must adhere to the University's minimum academic standards completing their degree programs within specified maximum timeframes. The University will take into consideration academic probation and mitigating circumstances such as illness, full-time employment, family obligations, etc.

Assistantships

Graduate School Traineeships (Teaching Assistantships, Graduate Assistantships)

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 $8514 in 1986 for the academic year. Normally all trainees qualify for a tuition waiver in addition to the stipend.

Research Assistantships

Appointments are for predoctoral candidates whose special training and qualifications enable them to serve as assistants to individual staff members in certain departments. Stipends may be up to $8514, depending on the nature of the assistance and the percent of effort.

Fellowships and Scholarships

Graduate Council Fellowships

Graduate Council Fellowships are awarded to highly qualified incoming graduate students of U.S. citizenship. The base amount of the Graduate Council Fellowship is $7600 for the 1986 academic year plus a full tuition waiver. Selection is made based on recognition of strong qualifications and potential for excellence in advanced graduate work and, funds permitting, may be renewed for two additional academic years by those students who maintain superior academic standing. The nature of this award is a full fellowship which is free of any teaching obligations.

Graduate Editorial Fellowship

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

may be obtained from Mrs. Smolker, *Quarterly Review of Biology* Office, Life Sciences Library, Room 10.

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 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.

Intercampus Doctoral Fellowships

The Intercampus Doctoral Fellowship Program was established by the SUNY Doctoral Council 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.

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.

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.

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.

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 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.

The Raymond F. 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.

President's Award for Excellence in Teaching

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

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.

Herbert H. Lehman Graduate Fellowships

Herbert H. Lehman Graduate Fellowships in Social Sciences, Public Affairs or International Affairs are awarded to incoming graduate students with U.S. residency for full-time study in an approved college or university in New York State. The basis of award is satisfactory promise of successful completion of a graduate program as determined by evaluation of academic record, test scores, and recommendations. These fellowships carry a stipend of $4000 for the first year of graduate study and $5000 a year thereafter for a maximum of four years of awards.

Sea Grant Scholar Awards

Sea Grant Scholars receive a stipend of $7750 that permits the student to work directly on his/her research to pursue careers in coastal zone management, marine environmental studies or coastal oceanography.

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 demon-

strated 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.

Financial Aid

The Office of Financial Aid and Student Employment administers several federal and state programs that provide funds to assist U.S. citizens and permanent residents in pursuing their academic goals. These programs are: the College Work-Study Program, National Direct Student Loan Program (NDSL), Guaranteed Student Loan Program (GLS), Auxiliary Loans to Assist Students (ALAS), Graduate Opportunity Tuition Waiver Program, New York State Tuition Assistance Program (TAP) and some private scholarships.

Application Procedures and Deadlines

The Financial Aid Form (FAF) must be filed in sufficient time to be received at the College Scholarship Service (CSS) in Princeton, New Jersey by mid-March. The Stony Brook Institutional Application must also be completed and returned to the Office of Financial Aid and Student Employment by mid-March. In particular, the Statement of Educational Purpose/Registration Compliance and Applicant's Statement must be signed and in the Financial Aid Office by mid-March. Income documentation must be received in the Financial Aid Office by the end of April. For entering graduate students the deadline for filing financial aid forms is 30 days after their date of acceptance into the University. Students are urged to contact the Financial Aid Office for the exact dates referred to above.

The Office of Financial Aid and Student Employment is located in Room 230 of the Administration Building.

New York State Tuition Assistance Program (TAP)

The Tuition Assistance Program is an entitlement program based on New York State net taxable income for the previous year. All eligible graduate students are required to apply for New York State's Tuition Assistance Program (TAP). The University uses TAP payments to supplement tuition waiver funds.

Eligibility

1. Graduate students enrolled full-time and making satisfactory academic progress, as defined by the State Education Department, towards an advanced degree. 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	2	3	4	5	6	7	8
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

2. Students taking six 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 required to complete the program following the summer session) or students who will complete their program of graduate study during the summer term.

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

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

Students receiving tuition waivers who are eligible for TAP 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, students are advised to follow up. Students who fail to apply or do not receive notification of award will be responsible for their tuition.

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

Graduate Award Schedules

The maximum annual award is $1200 and will be reduced according to family income level.

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.

Grants

Graduate Opportunity Tuition Waiver Program

A full waiver of tuition is available to former EOP, SEEK or HEOP students who enroll in a registered State University of New York graduate or first professional degree program.

Graduate and Professional Tuition Waiver Program for Economically Disadvantaged Students

This program provides up to a full waiver of tuition for students who qualify according to an analysis of household size, income, and family financial circumstances.

Loans

National Direct Student Loan (NDSL)

The Financial Aid Office offers assistance from the National Direct Student Loan (NDSL) to assist U.S. citizens and permanent residents in pursuing their academic goals. Funds are awarded on the basis of demonstrated financial need.

The 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 per academic year.

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 $5000 per year to an aggregate maximum of $25,000, including what the student borrowed as an

undergraduate, subject to financial need. There is a ½% loan fee charge at disbursement, plus a 5% origination fee. Repayment 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 Office. The application is then routed by the University to the lending institution and the Higher Education Services Corporation.

To be eligible for a guaranteed loan a student must be: 1) a U.S. citizen or permanent resident alien, a paroled refugee, or an asylum applicant (I-94 permit); and 2) enrolled in or admitted 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*
Undergrad.	$2500	$12,500
Grad. & Prof.	$5000	$25,000*

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 $50. 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 $3000 per year to an aggregate maximum of $15,000.

*Including undergraduate loans

College Work Study Program (CWSP)

The 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.

Residential Information

Housing on Campus

The Chapin Apartment Complex

The Apartment Complex is designed to house graduate and married students. Two- and three-bedroom apartments are available. Single students will share a bedroom in a three-bedroom apartment. 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. Married couples with children, or single parents may occupy entire two-bedroom apartments. Selected apartments have also been partially adapted to accommodate 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. There are no storage facilities available for furniture or personal property. The apartment rental rates vary and may be obtained by contacting the Chapin Apartment Complex Office

Residence Hall Housing

A limited number of single occupancy rooms are available for unmarried graduate students in Stage XII Quad. Keller International College, located in Stage XII Quad, is committed to the integration 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 Chapin 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.

All applicants are expected to reconfirm their interest in on-campus accommodations in writing between July 1 and August 15. Students who fail to do so will have their application removed from the current files. (Foreign students are encouraged to reply via telegram due to the difficulty in sending overseas mail.)

Housing Charges

Residence Halls
The rent for each person occupying a single space in Stage XII is currently $1750 per academic year and is payable on a semester basis (subject to change).

Chapin 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. A $100 nonrefundable room deposit is required in order to ensure a space once a room assignment has been offered. No funds should be sent until the student is notified to do so.

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 nondiscriminatory 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-$225. 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 $200-400 per month plus a percentage of the utilities cost. Apartment listings cover those available in stan-

dard 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 $350-$450 per month. A studio apartment in one of the apartment complexes is usually $350-450. Apartments in housing complexes usually provide more space and privacy. A conventional one-bedroom apartment, including living room, dining room, kitchenette, bathroom, and closet space, usually ranges in price from $400-$500 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 $400 to $1000 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.

Admission to Graduate Study

Requirements for Admission

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. To be considered for admission, all students must complete and submit the following:

A. An official graduate application form.

B. Three letters of recommendation.

C. 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.

D. Scores from the Graduate Record Examination (GRE) General Test (some programs also require the advanced test).

E. A non refundable application fee of $35.00.

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 judgment of the department and the Graduate School, are sufficient to enable him or her to progress satisfactorily in a degree program. A baccalaureate degree is required, with a minimum overall grade point average of 2.75; 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.

Early application is suggested for students seeking financial support. Admission and financial aid applications should be filed by February 1. Admission decisions are made by departments on a rolling basis. All documents should be on file by March 1 for fall semester admission and by October 1 for spring semester admission. Late applications will be accepted but will only be considered by departments where openings still exist.

Application materials may be obtained by contacting the Graduate School or by contacting the appropriate department of choice.

Waiver of Application Fee

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. To qualify for this waiver the student must have earned degrees from U.S. institutions: A student who has received an undergraduate degree from another SUNY campus or from any other institution located in New York State is eligible if she or he has an overall undergraduate GPA of 3.5 or better; a student from an American college or university outside of New York State must have an overall undergraduate GPA of 3.75 or better. The waiver request must be submitted with the application for admission which must include official copies of all transcripts.

The Admission Process

Admission is made to a particular department for a designated degree. Additional admission requirements are listed in each departmental section of this *Bulletin*. Admission application forms and additional departmental information may be obtained by writing to the appropriate department.

Should a student wish to change departments, he or she should contact the Graduate School to be advised on the procedure for doing so. Foreign students currently enrolled at Stony Brook who desire to change their program must obtain approval of the Office of Foreign Student Services, 113 Central Hall. For further instructions, contact the Graduate School.

An offer of admission to graduate study at Stony Brook is for a specific term. If for good reason the applicant is unable to enroll for the term specified, he or she should request a deferment of admission. If the request is granted by the department, the student will be sent a new offer of admission for the subsequent term and the Graduate School will be notified accordingly. A student who does not enroll within 12 months of the first day of classes of the term of the original offer of admission must submit a new application and a new application fee. Foreign students must submit a new foreign student financial affidavit and have necessary immigration papers processed.

Readmission

Graduate students who have interrupted their attendance at Stony Brook after earning a degree, by withdrawing from the University, or by taking a leave of absence must be readmitted to graduate study. The student initiates the process by sending a written request to the major department. If the department approves the request, the readmission form is submitted to the Graduate School along with an unofficial Stony Brook transcript. Foreign students must also submit a new financial affidavit and be cleared by the Office of Foreign Student Services before the readmission process can be concluded. The department and/or the Graduate School may set specific requirements to be fulfilled by the readmitted student during the first year of readmission.

Provisional Admission

In exceptional cases where certain admission requirements are not met or 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.

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

Graduate Record Examination

The Graduate Record Examination (GRE) 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 (the Stony Brook Code is 2548). Students who are admitted provisionally without the GRE must take the examination at the first testing date during the first semester of registration at Stony Brook. Failure to take the examination will prevent the student from registering for the next term.

For information concerning this examination write to the Educational Testing Service, Princeton, New Jersey 08540, or P.O. Box 27896, Los Angeles, California 90027. Applications for the GRE are available in the Office of Career Development, W-0550 Library.

Non-Matriculated Status (GSP)

Any person holding a baccalaureate degree or its equivalent, or an advanced degree from an accredited institution of higher learning, is eligible for admission to

the University as a non-matriculated graduate student. Such students may enroll in graduate courses through the Center for Continuing Education as a nondegree student. Enrollment is limited to those courses for which the student can obtain permission to register taking into consideration the student's background and course enrollment limitations. If a nondegree student later wishes to pursue a graduate degree, this student will need to make a formal application for admission to a departmental degree program. For those students who are admitted into degree programs, a maximum of 12 graduate credits from nondegree graduate status can be transferred to matriculated graduate degree status at Stony Brook (See Transfer of Credits section).

Admission of Undergraduates to Graduate Courses

Undergraduates of exceptional ability, upon the request of the Graduate Studies Director of a department and of the instructor to the Vice Provost for Research and Graduate Studies, may be admitted to graduate courses. Graduate courses taken while an undergraduate remain part of the undergraduate record, except for students in approved combined five-year bachelor's/master's programs or for those who have already been accepted for graduate study at the State University of New York at Stony Brook. Undergraduate students who have been admitted to the Graduate School at Stony Brook may apply a maximum of six graduate credits toward the graduate degree for courses taken after admission to the Graduate School. These credits may not be applied to the undergraduate degree.

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.

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, G2, G3, G4, or G5 depending on the program to which they have been admitted and their previous graduate training. If the student earned less than 24 graduate credits at another institution before being admitted, he or she will be classified as G1 in a master's program or G3 in a doctoral program. If having earned more than 24 graduate credits before being admitted, a student will be classified as G2 in a master's program or G4 in a doctoral program.

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, G2, G3, G4, or G5, 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 admitted, he or she will be classified as G1 in a master's program or G3 in a doctoral program. If a student has earned more than 24 graduate credits at another institution before being admitted, he or she will be classified as G2 in a master's program or G4 in a doctoral program. Students who complete the necessary requirements for the doctoral degree except for the writing of the dissertation are classified as G5 upon advancement to candidacy.

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 must demonstrate proficiency in English prior to matriculation. To be considered for admission, an applicant must present a score of 550 or higher on the Test of English as a Foreign Language (TOEFL). Students who wish to be considered for a teaching assistantship must also take the Test of Spoken English (TSE) and pass with a score of 240 or greater. These tests are given at centers throughout the world on several dates each year. Further information is available by writing to the Educational Testing Service, Princeton, New Jersey, 08540, USA.

Admission to the Graduate School is contingent upon satisfactory fulfillment of the English proficiency requirement. Under extraordinary circumstances a department may request a waiver of the English proficiency requirement from the Vice Provost for Research and Graduate Studies. However approval of such waivers shall be rare and shall only be given if the quality of both graduate and undergraduate education at the University is not compromised. Students who fail to meet the requirement or who have received a waiver may be tested upon arrival.

Financial Verification

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 for financing their education at Stony Brook and for living expenses. The University Form SUSB 1202 included in foreign students' application material, must be submitted for this purpose before immigration documents will be sent to the students.

1-20 Documentation

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

Graduate Degree Programs

Stony Brook offers graduate degrees through a number of departments and programs. Graduate curricula at Stony Brook are grouped into three categories: **Program** refers to a graduate degree program approved and registered with the central administration of the State University of New York and the State Education Department. All graduate degrees are awarded in the name of the *program;* **Graduate Studies** refers to a formal curriculum within a graduate program that has a distinct faculty, and specific admission and graduation requirements; **Concentrations** refers to the curriculum within the graduate studies or program organized to focus on an area of special interest.

The following list indicates the degrees offered by each department as well as the various concentrations possible within each degree program. HEGIS numbers can be found in the index of this *Bulletin.*

Graduate Degree Programs	Concentrations/Graduate Studies
COLLEGE OF ARTS AND SCIENCES	
Division of Biological Sciences	
Biological Sciences, M.A.,[1] Ph.D.	Cellular & Developmental Biology Ecology and Evolution Genetics Molecular Biology & Biochemistry Neurobiology & Behavior
Division of Humanities and Fine Arts	
Art Criticism (Art History), M.A.	
Studio Art, M.F.A.	
English, M.A., Ph.D.	Creative Writing (terminates at the masters level) Comparative Literature
Foreign Language Instruction, D.A.[2]	French Italian German Spanish Russian
Foreign Language Instruction with a concentration in TESOL, D.A.	
Germanic Languages & Literatures, M.A., Ph.D.[3]	Russian and Slavic Scandinavian
Hispanic Languages & Literature M.A., Ph.D.	Spanish Portuguese
Music, M.A., Ph.D.	Music History Music Theory Music Composition
Music Performance, M.M., D.M.A.	
Philosophy, M.A., Ph.D.	Philosophical Perspectives (terminates at the masters level)
Theatre, M.A.	
Dramaturgy, M.F.A.	
Division of Physical Sciences and Mathematics	
Chemistry, M.S., Ph.D.	Chemical Physics Chemical Biology
Earth & Space Sciences, M.S., Ph.D.	Astronomical Sciences Astronomy Astrophysics Planetary Sciences Geological Sciences Geochemistry Geophysics Tectonics Sedimentary Geochemistry Paleontology

[1] *The Masters program is currently not accepting new students.*
[2] *The Doctor of Arts degree is primarily for those persons continuing a career in teaching at the secondary or post-secondary level.*
[3] *The Ph.D. program is currently not accepting new students.*

Mathematics, M.A., Ph.D.	Secondary Teacher Option (grades 7-12) (terminates at the masters level) Professional Option (for students who plan careers as mathematicians in industry, government or academia)
Physics, M.A., M.S., Ph.D.	Graduate Study in Teaching of Physics (terminates at the masters level)
Scientific Instrumentation, M.S.	Interdepartmental Concentrations: Astrophysics - Dept. of Earth & Space Sciences Biophysics - Dept. of Pharmacology & the Dept. of Physiology & Biochemistry (School of Medicine) Chemical Physics - Dept. of Chemistry

Division of Social and Behavioral Sciences

Anthropology, M.A., Ph.D.	Anthropological Sciences Applied Anthropology (terminates at the masters level)
Economics, M.A., Ph.D.	
History, M.A., Ph.D.	
Linguistics: Applied Linguistics, M.A. Teaching of English to Speakers of Other Languages, TESOL, M.A. Foreign Language Instruction with a concentration in TESOL, D.A.	
Political Science, M.A., Ph.D.	Political Psychology/Behavior Public Policy American Politics
Psychology, M.A., Ph.D.	Clinical Psychology Developmental Psychology Experimental Psychology Biopsychology Social Psychology
Sociology, M.A., Ph.D.	

W. AVERELL HARRIMAN COLLEGE FOR
POLICY ANALYSIS AND PUBLIC MANAGEMENT

Urban and Policy Sciences, M.S.	Government Non Profit Management Enterprise Management

MARINE SCIENCES RESEARCH CENTER

Marine Environmental Sciences, M.S.
Coastal Oceanography, Ph.D.

COLLEGE OF ENGINEERING AND APPLIED SCIENCES

Applied Mathematics and Statistics, M.S., Ph.D.	Applied Mathematics Operations Research Statistics
Computer Science, M.S., Ph.D.	
Electrical Engineering, M.S., Ph.D.	
Materials Science, M.S., Ph.D.	
Mechanical Engineering, M.S., Ph.D.	Solid Mechanics Energy Systems & Fluid Mechanics Mechanical Design (terminates at the masters level) Atmospheric Sciences
Technology Systems Management, M.S.	Educational Computing Systems Planning and Management Industrial Management

HEALTH SCIENCES CENTER

School of Medicine

Basic Health Sciences, M.S., Ph.D.	Anatomical Sciences Molecular Microbiology Oral Biology & Pathology Experimental Pathology Pharmacological Sciences Physiology & Biophysics

Academic Regulations and Procedures

All programs, regulations and schedules of dates are subject to change or withdrawal depending on the availability of funds and the approval of programs by appropriate State authorities.

It is the student's responsibility to stay abreast of University regulations and procedures as set forth in this *Bulletin* and in official campus publications and notices.

Organization of Graduate Education at Stony Brook

Under the direction of the Provost, Graduate School administration rests with the Vice Provost for Research and Graduate Studies and the administrative staff of the Graduate School in conjunction with the Graduate Council, composed of faculty, students and administrators.

The Graduate Council

The membership of the Council includes the Provost, *ex officio;* the Vice Provost for Graduate Studies; two faculty members elected by the SUSB Senate from each of the following groups: Arts and Humanities, Behavioral Sciences, Biological Sciences, Engineering Sciences, Mathematical Sciences, Social Sciences; two faculty members from the Health Sciences; a member from the Center for Continuing Education; one faculty member of the Library elected by the Library faculty; one member elected by core campus non-teaching professionals; and a graduate student representative chosen by the Graduate Student Organization. Elected faculty members serve for three years with staggered terms. The chairperson and the secretary of the Graduate Council are elected by the Council. 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.

The Department

Each department exercises a large measure of responsibility for its graduate program. Under the general responsibility of the department Chairperson, each department has a departmental committee on graduate students and a graduate studies director who administers departmental graduate activities. 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 graduate studies director. For purposes of graduate education they function as do departments in other disciplines.

Registration

All students who are enrolled in the Graduate School in any program and who have not been granted a leave of absence by the Vice Provost must register each fall and spring for at least one credit until all degree requirements have been met. Students who hold graduate traineeships, research assistantships or predoctoral fellowships must be registered as full-time students. Neither departments nor faculty members individually have authority to waive these rules.

A student is not considered to be 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. All graduate students, whether in residence or in absentia, must maintain matriculated status by completing their registration during the regular times designated by the Office of Records/Registrar for graduate student registration. Students failing to register during the advance registration or final registration periods may still register during the first two weeks of the semester, but will be charged a *late registration fee* of $20.00. Registration is ordinarily not permitted after the end of the second week of classes.

Maintaining Matriculated Status

The requirement that all candidates for degrees register for at least one credit in thesis or dissertation research each semester (or summer term if they plan to graduate in August) applies even to those who are using the library, laboratories or computer facilities; to those who are consulting with the faculty while working on their dissertations, and to those who are preparing for or taking qualifying or oral examinations at the master's or doctoral level.

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 semester or term are eligible for graduation the next time degrees are awarded, without additional registration. Students who complete all degree requirements during the summer term 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 the summer term begins must register for the summer term to be eligible for the August degree.

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 the first two weeks of the term are deleted from the student's record. For courses dropped during the first four weeks, tuition is charged at the rates specified in "Schedule of Tuition Liability" in this *Bulletin.* After the fourth week of classes no course may be added or dropped. Should it become impossible for a student to complete a course for a reason such as illness or accident, he or she may petition the Vice Provost for Research and Graduate Studies for a waiver of the deadline. Such petitions must be approved by both the Chairperson and the Graduate Studies 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.

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 be currently registered or 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 Graduate Studies Director of the individual department. If the Graduate Studies Director and the Chairperson of the department approve the request for leave, they recommend ap-

proval 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.

Withdrawal from the University

A student finding it necessary to withdraw from the University must obtain a withdrawal card from the Office of Records/ Registrar. This card must be approved by the appropriate offices indicated on the card and by the Graduate School. The effective date of withdrawal is the date upon which the completed withdrawal card is returned to the Office of Records/Registrar. The process of withdrawing from the University is a formal procedure and the student has the responsibility for initiating it. Students may withdraw from the University up to the last day of classes; however, financial liability to the University still remains. (See Schedule of Tuition Liability.)

Students are urged to discuss all withdrawals with the Graduate Studies Director 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.

Dissertation Research Away from Campus

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

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

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 Graduate Studies Director.

SUNY Exchange Program

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 prerequisites 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. 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 Stony Brook, 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 Stony Brook.

Transfer of 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 the Center for Continuing Education (CED) or Non-matriculated Status (GSP)

1. A maximum of 12 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.
2. A maximum of six credits of CED courses or CED crosslisted courses may be transferred. If a student transfers six credits of CED courses or CED crosslisted courses, only six graduate credits from non-degree graduate status (GSP) at Stony Brook can be transferred to matriculated graduate status.
3. 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.

The 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 March 15 for courses of the preceding fall semester; November 1 for courses of the preceding spring semester. However, the instructor may require that the work be completed at any time prior to the end of the Incomplete extension period. In granting a grade of I the instructor signifies a willingness to receive student work and prepare grades in accordance with these deadlines. If final grades are not reported to the Office of Records/Registrar by the specified dates, the grade of I will automatically be changed to I/F. Students should confer with their professors to establish how far in advance of the deadline work must be completed. Extension to the end of the succeeding term may be requested by written faculty petition to the Graduate School; any subsequent exception must be appealed by the student with a written letter of support or denial by the faculty member addressed to the Graduate School.

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.

Courses which are normally offered on a *S/U* basis are so indicated in the Graduate Class Schedule published for each term.

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. The entry of an I, NR, or no grade at all will automatically be calculated into the GPA as F until properly changed to a letter grade.

Change of Grade

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.

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.

Part-time students: A student enrolled part-time who has accumulated nine semester credits with a cumulative average below 3.0 will have two semesters or six credits (whichever is longer) to bring his or her cumulative GPA to 3.0.

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.

Standards of Conduct

The University expects of all its students cooperation in developing and maintaining high standards of scholarship and conduct.

Students are expected to meet academic requirements and financial obligations, as specified elsewhere in this *Bulletin,* in order to remain in good standing. Certain nonacademic rules and regulations must be observed also.

The University wishes to emphasize its policy that all students are subject to the rules and regulations of the University currently in effect or which, from time to time, are put into effect by the appropriate authorities of the University. Students, in accepting admission, indicate their willingness to subscribe to and be governed by these rules and regulations and acknowledge the right of the University to take such disciplinary action, including suspension and/or expulsion, as may be deemed appropriate. University authorities will take action in accordance with due process.

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, 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.

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.

Grievance Procedures

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

Student Educational Records

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

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

After administrative remedies available at the University have been exhausted, inquiries or complaints may be filed with the Family Educational Rights and Privacy Act Office, Department of Health 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 recommendation.

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

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

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

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

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

Graduate Majors, Codes

Graduate Majors	*Code*
Anthropology	ANT
Applied Linguistics	LIN
Applied Mathematics and Statistics	AMS
Art Criticism	ARH
Astronomical Sciences	AST
Biological Sciences, M.A.	BIO
Cellular and Developmental Biology	BCD
Chemistry	CHE
Coastal Oceanography	OCN
Comparative Literature	CLG
Computer Science	CSE
D.A. Foreign Languages	
French	DLF
German	DLG
Italian	DLI
Russian	DLR
Spanish	DLS
TESOL	DLT
Dramaturgy	DRM
Earth and Space Sciences	ESS
Ecology and Evolution	BEE
Economics	ECO
Electrical Engineering	ESE
English	EGL
French	FRN
Genetics	BGE
Geological Sciences	GEO
Germanic Languages and Literatures	GER
Hispanic Languages and Literature	SPN
History	HIS
Italian	ITL
Marine Environmental Sciences	MAR
Materials Science and Engineering	ESM
Mathematics	MAT
Mechanical Engineering	ESC
Molecular Biology	BMO
Music	MUS
Neurobiology and Behavior	BNB
Philosophy	PHI
Physics	PHY
Policy Analysis and Public Management	PAM
Political Science	POL
Psychology	PSY
Sociology	SOC
Studio Art	ARS
Technology and Society	EST
TESOL	ESL
Theatre Arts	THR
Basic Health Sciences	
Anatomical Sciences	HBA
Molecular Microbiology	HBM
Oral Biology and Pathology	HBO
Pathology	HBP
Pharmacology	HBH
Physiology and Biophysics	HBY

Academic Calendar

Fall Semester 1986

August 16, Saturday / Summer residents without fall room assignments must check out.

August 20, Wednesday / Summer residents with fall room assignments move to fall rooms.

August 22 and 25, Monday and Friday / Foreign students arrive and all new graduate students may check in.

August 25-29, Monday-Friday / Final registration and payment (or proper deferral) of fees for all students not previously registered (schedule announced prior to registration). Foreign student orientation.

August 27, Wednesday / Residence halls open for new student check-in.

August 27-29, Wednesday-Friday / Undergraduate student orientation for students not having participated previously.

August 29 and September 2, Friday and Tuesday / Residence halls open for returning student check-in.

September 1, Monday / Labor Day.

September 2, Tuesday / **Classes begin.** Late registration begins with $20 late fee assessed.

September 4, Thursday / Senior Citizen Auditor Program registration.

September 8, Monday / Last day for students to drop a course without tuition liability.

September 9, Tuesday / Tuition liability begins for all students.

September 12, Friday / Last day to file for December graduation; undergraduates file application at Office of Records / Registrar; graduate students (except CED) file at Graduate School Office; CED students file at CED Office. Last day for May graduation candidates (undergraduates) to file degree application at Office of Records and receive notification before advanced registration for spring semester.

September 15, Monday / End of late registration period. Last day for undergraduate students to add a course or to drop a course without a W (Withdrawal) grade being recorded. Last day for undergraduates to change status to or from full-time / part-time.

September 26, Friday / Last day for graduate students to add or drop a course.

September 30, Tuesday / Classes follow Friday schedule.

October 1, Wednesday / Classes follow Monday schedule.

October 3, Friday / Recess (classes not in session).

October 9, Thursday / Last day for payment of deferred fall semester fees.

October 13, Monday / Yom Kippur (classes not in session).

October 29, Wednesday / Fall quarter housing period ends.

October 31, Friday / Last day for undergraduate students to withdraw from a course without withdrawing from the University. Last day to change courses to or from Pass / No Credit.

November 3, Monday / Last day for removal of Incomplete and NR (No Record) grades from spring semester and summer session.

November 4, Tuesday / Election Day (classes in session).

November 12-21, Wednesday-Tuesday / Prime Time for Students (intensive academic advising period).

November 17-26, Monday-Wednesday / Advanced registration for spring semester for undergraduate students begins (schedule announced prior to registration).

November 26, Wednesday / Thanksgiving recess begins at close of classes.

December 1, Monday / Classes resume.

December 1-2, Monday-Tuesday / Advanced registration for spring semester for graduate students.

December 12, Friday / **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.

December 15, Monday / Final examinations begin; final grades due in Registrar's Office 72 weekday hours after scheduled examination.

December 19, Friday / Final examinations end. Fall semester ends. Residence halls close for fall semester. Intersession begins at close of examinations. Final grades due for all classes without scheduled final examinations.

December 20, Saturday / Intersession housing begins.

January 2, Friday / Last day for departments to submit Completion Statements for December master's and doctoral degree candidates.

Spring Semester 1987

December 30, Tuesday / Last day for mail payments of spring semester fees for preregistered students.

January 8, Thursday / Last day for preregistered students to pay spring semester fees in person without late payment penalty.

January 15, Thursday / Intersession housing ends. Residence halls open for new student check-in at 1 p.m. Last day for continuing resident students to check out without incurring financial liability.

January 16, Friday / Foreign students arrive.

January 19, Monday / Martin Luther King, Jr. Day.

January 21-23, Wednesday-Friday / Final registration and payment (or proper deferral) of fees for all students not previously registered (schedule announced prior to registration). Undergraduate new student orientation.

January 26, Monday / **Classes begin.** Late registration period begins with $20 late fee assessed. Senior Citizen Auditor Program registration.

January 30, Friday / Last day for all students to drop a course without tuition liability.

February 2, Monday / Tuition liability begins for all students.

February 6, Friday / End of late registration period. Last day for undergraduate students to add a course or to drop a course without a W (Withdrawal) grade being recorded. Last day for undergraduates to change status to or from full-time / part-time. Last day for students to file for May graduation (and for August candidates to apply if they wish to attend University commencement in May). Undergraduates file at the Office of Records / Registrar; graduate students (except CED) file at the Graduate School Office; CED students file at the CED Office.

February 12, Thursday / Lincoln's Birthday (classes in session).

February 16, Monday / Washington's Birthday observed (classes in session).

February 18, Wednesday / Last day for graduate students to add or drop a course.

March 5, Thursday / Last day for payment of deferred spring semester fees.

March 9-13, Monday-Friday / Winter recess.

March 16, Monday / Classes resume. Last day for removal of Incomplete and NR (No Record) grades from the fall semester.

March 27, Friday / Spring quarter housing period ends. Last day for undergraduates to withdraw from a course without withdrawing from the University. Last day to change courses to or from Pass / No Credit.

April 13-17, Monday-Friday / Spring recess.

April 20-28, Monday-Tuesday / Prime Time for students (intensive academic advising period).

April 20, Monday / Last day for graduate students to submit theses and dissertations to Graduate School for May graduation.

April 20-21, Monday-Tuesday / Advanced registration for fall semester for graduate students.

April 22-May 1, Wednesday-Friday / Advanced registration for fall semester for undergraduates (schedule announced prior to registration). Bills for fall semester to be mailed approximately June 1 with payment due during latter part of July.

May 4, Monday / Registration begins for summer session with fees payable at time of registration.

May 15, Friday / **Last day of classes.** Last day to withdraw from the University.

May 18, Monday / Final examinations begin; final grades due in Registrar's Office 72 weekday hours after scheduled final examinations.

May 22, Friday / Final examinations end. Spring semester ends. Residence halls close for all except graduating seniors and summer residents. Final grades due for all courses without scheduled final examinations.

May 24, Sunday / Commencement. All residence halls close.

May 29, Friday / Last day for departments to submit Completion Statements for May master's and doctoral degree candidates.

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

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. A maximum of six continuing education (CED) credits may be applied toward the 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
At least one semester of supervised teaching experience is required except for those programs in which teaching is not germane to the degree objectives.

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 Graduate Studies Director may recommend to the Vice Provost for Research and Graduate Studies that the master's degree by granted.

H. Time Limit
Depending on the student's first-time, matriculated enrollment in the Graduate School, full-time students must complete all degree requirements within three years; part-time students in five years. If enrollment status changes at a later time, this policy is determined by the student's initial entrance status. In rare instances, the Vice Provost for Research and Graduate Studies will entertain a petition bearing the endorsement of the Graduate Studies Director 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 in Liberal Studies Degree

This is a terminal, non-research degree offered by the Center for Continuing Education (CED). 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 Graduate Studies Director. 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 Graduate Studies Director.

E. Dissertation
A dissertation is required for the Ph.D. degree. It must convey in a clear and convincing manner the results of an original and significant scholarly investigation. Depending upon the character of the student's research, the Graduate Studies

Director 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 three members of the faculty, appointed by the Vice Provost for Research and Graduate Studies. This committee includes a dissertation supervisor, defense chairperson, at least two faculty members from the department or program, and at least one person outside the department or University. This outside member should have expertise in this student's research field so as to be able to understand, criticize and contribute to it, as well as to judge the quality and significance of the research. The dissertation supervisor cannot serve as chairperson of the Examining 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
At least a semester of 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.

K. Departmental Recommendation
When all departmental requirements are completed, the Graduate Studies Director may recommend to the Vice Provost for Research and Graduate Studies that the Ph.D. 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 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
The student 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. Internship
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 Dissertations" available from the Graduate School. The State University of New York at Stony Brook does not allow multiple authorship for a dissertation.

I. Dissertation Examining Committee
The dissertation must be approved by a dissertation examining committee of at least three members of the faculty, appointed by the Vice Provost for Research and Graduate Studies. This committee includes a dissertation supervisor, defense chairperson, at least two faculty members from the department or program, and at least one person outside the department or University. This outside member should have expertise in this student's research field so as to be able to understand, criticize and contribute to it, as well as to judge the quality and significance of the research. The dissertation supervisor cannot serve as chairperson of the Examining Committee.

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.

J. 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.

K. Degree Application
The submission of a signed degree card to the Graduate School is required 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 Graduate Studies Director may recommend to the Vice Provost for Research and Graduate Studies that the D.A. degree be granted.

M. 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.

N. 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 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 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 an approved 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 Candidacy
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 Graduate Studies Director.

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 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.

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 Studies 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 semester 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*.

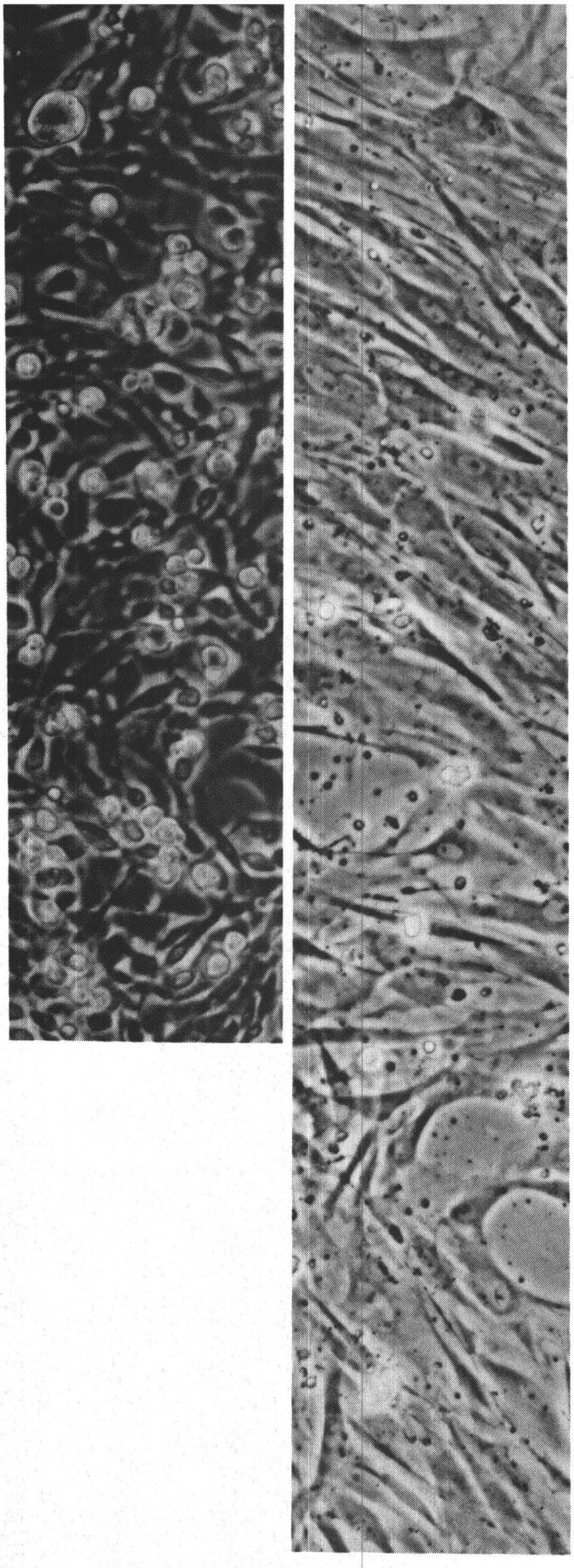
Waiver of Regulations

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 Studies Director, who shall append their reasons for believing that the requested waiver would not result in a breach of the spirit of the regulations.

College of Arts and Sciences

Division of Biological Sciences

Dean Richard Koehn
Graduate Biology 130
(516) 632-8520



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 Biochemistry, 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 Studies Director.

Cellular and Developmental Biology (BCD)

Graduate Studies Director: Harvard Lyman
Department of Anatomical Sciences
Life Sciences Building 310 (516)632-8534

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 continuous and synchronized cell culture as well as equipment for all major molecular biological and biochemical analyses. The electron microscope facility houses two transmission scopes and one scanning scope along with all accessory equipment. Besides coursework and seminars, students in the program have an early opportunity to work in the laboratories of selected faculty members to gain laboratory experience and help them decide which area of cellular and developmental biology they wish to pursue further.

Admission

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 (GRE) General Test scores.

C. Acceptance by both Graduate Studies In Cellular and Developmental Biology 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 enrolled 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 consultation 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

Bennett, John, Scientist.[9] Ph.D., 1971, University of Queensland, Australia: Chloroplast structure, functional and development in higher plants; chloroplast protein phosphorylation.

Berrios, Miguel, Research Assistant Professor.[5] Ph.D., 1983, Rockefeller University: Structural polypeptides of the cell nucleus; molecular events that determine nuclear envelope assembly and disassembly during the cell cycle.

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

Brugge, Joan S., Associate 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 5S 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-to-cell communication; immunocytochemical localization of membrane proteins.

Dudock, Bernard S., Professor.[2 12] 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, The 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.[13] Ph.D., 1975, Emory University: Energy transduction in muscle; structure-function correlates of thick filament shortening.

Katz, Eugene R., 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.[9] 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.

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

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., Associate 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.[9] 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.

Tseng, Linda, Associate Professor.[8] Ph.D., 1968, University of North Dakota: Cellular molecular biology of reproductive endocrinology in uterus.

Walcott, Benjamin, Associate Professor.[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., 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 1985: 28

[1] *Department of Anatomical Sciences*
[2] *Department of Biochemistry*
[3] *Department of Microbiology*
[4] *Department of Neurobiology and Behavior*
[5] *Department of Pharmacological Sciences*
[6] *Department of Neurology*
[7] *Department of Oral Biology and Pathology*
[8] *Department of Obstetrics & Gynecology*
[9] *Brookhaven National Laboratory*
[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*
[12] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1973-74*
[13] *Department of Allied Health Resources*

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 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 diur-

nal, tidal and lunar cycles, for direction-finding (homing and orientation) and for day-length measurement (photoperiodism); chronopathology and chronopharmacology; aging and life cycle clocks; possible molecular mechanisms of the clock.
Spring, 3 credits

BCD 537 Physiology and Biochemistry of the Cell Cycle
An integrated view of the cell 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-to-cell interactions in defining developing systems. Crosslisted with HBA 657.
Prerequisite: BCD 656
Fall, 3 credits

BCD 682-684 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: Jeffrey S. Levinton
Life Sciences Building 650 (516)632-8600

Graduate Studies Director: Douglas J. Futuyma
Life Sciences Building 650 (516)632-8608

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 from the Graduate Studies Director 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 modern buildings. 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 with an IBM 4361 super mini-computer.

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 admits only 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 Record Examination (GRE) General Test 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, taxonomy or other areas.

B. Preliminary Examination
Early in the third 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 before or during the third semester. The advisory committee, consisting of the permanent advisor and at least two other faculty in Graduate Studies in Ecology and Evolution, is nominated by the student in consultation with her or his permanent advisor and must be approved by the Graduate Studies 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 24 credit hours of graduate courses in Graduate Studies in Ecology and Evolution.

Faculty

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., Associate 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, Associate 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., Associate Professor. Ph.D., 1976, State University of New York at Stony Brook: Population and biochemical genetics of *Drosophila;* molecular evolution.

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

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

Futuyma, Douglas J., Professor and Graduate Studies Director.[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. Ph.D., 1970, Agrophysical Institute, Leningrad, U.S.S.R.: Evolutionary theory; mathematical population genetics; theoretical and applied ecology.

Gurevitch, Jessica, Assistant Professor.[8] Ph.D., 1982, University of Arizona: Evolutionary ecology of plant populations and communities; plant physiological ecology.

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

Janson, Charles H., Assistant Professor.[8] Ph.D., 1985, University of Washington, Seattle: Social ecology of vertebrates; plant dispersal strategies.

Johnson, Nelson, Research Assistant Professor.[8] Ph.D., 1980, California Institute of Technology. Plant ecology; chemical ecology.

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.

Lonsdale, Darcy J., Research Assistant Professor.[8] Ph.D., 1979, University of Maryland: Marine ecology, life histories, biology of copepods.

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

Menzel, Emil W., Professor.[9] Ph.D., 1958, Vanderbilt University: Behavioral ecology of primates.

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

Prestwich, Glenn D., 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 and constraints; *Hydra;* ecotoxicology.

Susman, Randall L., Associate Professor.[1] Ph.D., 1976, University of Chicago: Primate ecology.

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

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

Number of teaching graduate and research assistants, fall 1985: 36

[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*
[8] *Department of Ecology and Evolution*
[9] *Department of Psychology*

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 Program 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 Program Executive Committee.
Fall and spring, 1-3 credits, repetitive.

BEE 550 Principles of Ecology
Population dynamics, interactions of organisms, 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 evolutionary theory. The effects of mutation, recombination, selection and migration are studied. Modern concepts in both theoretical and experimental population genetics are covered.
Prerequisites: BIO 220, BEE 552 or their equivalents, and a course in evolution
Spring, even years, 3 credits

BEE 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
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: MAR 555 or permission of instructor
Spring, 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 PASCAL 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

BEE 588 Current Topics in Ecology and Evolution
The subject matter of the special topics course varies from semester to semester, depending upon the interests of students and staff.
Fall and spring, variable and repetitive credit

BEE 599 Research
Original investigation undertaken with the supervision of a member of the staff.
Fall and spring, variable and repetitive credit

BEE 670 Informal Seminar
Presentation of preliminary research results and current research problems by students and faculty.
Fall and spring, no credit

BEE 671, 672 Ecology and Evolution Colloquium
A weekly series of research seminars presented by visiting scientists as well as by the faculty. Required every semester of all ecology and evolution graduate students.
Fall and spring, no credit

BEE 689 Seminar on Adaptations of Marine Organisms
Seminars on selected topics concerning ecological, genetical and evolutionary problems in the marine environment.
Fall and spring, 2 credits, repetitive

BEE 690 Seminar on Evolutionary Processes
Seminars on selected topics concerning evolutionary processes.
Fall and spring, 2 credits, repetitive

BEE 691 Seminar on Systematics and Phylogeny
Seminars on selected topics in systematics. Topics will include the theory of classification and numerical taxonomy, both phenetic and cladistic.
Fall and spring, 2 credits, repetitive

BEE 692 Seminar on the Environment and Human Affairs
Student seminars on selected topics concerned with the effect of man on the environment. Application of ecological and evolutionary theory to the solution of human problems.
Fall and spring, 2 credits, repetitive

BEE 693 Seminar on Population and Community Ecology
Student seminars on selected topics in population and community ecology.
Fall and spring, 2 credits, repetitive

BEE 699 Dissertation Research
Original investigations undertaken as part of the Ph.D. Program in Ecology and Evolution.
Prerequisite: Advancement to candidacy
Fall and spring, variable and repetitive credit

Genetics
(BGE)

Graduate Studies Director: Eugene R. Katz
Life Sciences Building 156 (516)632-8781

Graduate Studies in Genetics, an interinstitutional 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 laboratory rotations where the student will spend a full semester in each of two different laboratories where he or she will have the opportunity to gain a hands-on knowledge of the methods and approaches taken by each laboratory. Each trainee will have a faculty advising committee that will aid in tailoring a set of specialty courses, from offerings both within and outside the program, to meet the student's particular needs. Seminars involving both internal speakers and outside visitors will ensure that the predoctoral students continually are exposed to the full range of interests represented in the Graduate Studies.

Facilities

The primary training facilities are the State University of New York at Stony Brook and the Cold Spring Harbor Laboratory. A secondary facility is the Brookhaven National Laboratory. At Stony Brook the faculty is drawn from the departments of the College of Arts and Sciences and departments of the Health Sciences Center. The three Arts and Sciences biological 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 (GRE) General Test 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 two different laboratories during the two semesters. The particular laboratories will be decided by the student's advisory committee in conjunction with the student. One or two additional rotations may be taken in the summer.
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.

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., Associate 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 University: 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.*

Enrietto, Paula J., Research Assistant Professor.[3] Ph.D., 1980, University of Colorado: The transforming function of proteins coded by RNA tumor-virus oncogenes.

Fields, Stanley, Assistant Professor.[3] Ph.D., 1981, Cambridge University, England: Control of gene expression in yeast.

Fisher, Paul A., Assistant Professor.[10] M.D., Ph.D., 1979, Stanford University: Structure and function of the cell nucleus; enzymology of eukaryotic DNA synthesis.

Ginzburg, Lev R., Professor.[4] Ph.D., 1970, Agrophysical Institute, Leningrad, U.S.S.R.: Theoretical population genetics; multilocus population genetics; selective and neutral variation; ecological genetics.

Gluzman, Yakov, Senlor Staff Scientist.[7] Ph.D., 1977, Welzmann Institute, Israel: Mechanism of transformation induced by small DNA tumor viruses (SV40, adenovirus).

Grodzicker, Terri, Senior Scientist.[7] Ph.D., 1969, Columbia University: Animal virus genetics, nonsense mutations and suppression; genetic analyses of viral gene functions.

Hayman, Michael J., Professor.[3] Ph.D., 1973, Institute for Medical Research (London): Molecular functions of the avian erythroblastosis-virus oncogene product and the related cellular receptor for epithelial cell growth factor.

Hearing, Patrick, Assistant Professor.[3] Ph.D., 1980, Northwestern University: Adenovirus molecular genetics; control of eukaryotic transcription.

Herr, Winship, Senior Staff Investigator.[7] Ph.D., 1982, Harvard University: Transcriptional control of gene expression mechanisms in mammalian cells.

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., 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.

Marcu, Kenneth B., Associate 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.

Mathews, Michael B., Senior Staff Scientist.[7] Ph.D., 1969, Cambridge University, England: Control of translation and transcription in human cells.

Muzyczka, Nicholas, Associate Professor.[3] Ph.D., 1974, The Johns Hopkins University: The genetics and molecular biology of adeno-associated virus; mammalian cloning vectors.

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.

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.

Stillman, Bruce W., Senior Staff Investigator.[7] Ph.D., 1979, Australian National University: Mammalian virus DNA replication and tumor antigens.

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.

Taichman, Lorne B., Associate Professor.[11] M.D., 1965, Toronto University; Ph.D., 1971, University of Wisconsin: Viral expression in differentiating keratinocytes.

Tegtmeyer, Peter, Professor.[3] M.D., 1960, St. 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.

Wigler, Michael H., Senior Staff Investigator.[7] Ph.D., 1978, Columbia University: Mechanisms of growth control.

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.

Zollar, Mark, Senior Staff Investigator.[7] Ph.D., 1980, University of California, San Diego: Protein-DNA interactions.

Number of teaching, graduate and research assistants, fall 1985: 31

[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 Pharmacological Sciences*
[11] *Department of Oral Biology and Pathology*

Courses

BGE 510 Graduate Genetics
This introductory course for graduate students will cover a specific topic each time it is offered and will treat that topic from different scientific perspectives, such as, a) Molecular Genetics, b) Developmental Genetics, c) Immunogenetics, d) Evolutionary Genetics, and e) Human Genetics. The semester topics will include Genetic Recombination, Mutation and Gene Organization.
Prerequisite: Permission of instructor
Spring, 3 credits

BGE 530 Laboratory Rotation
The student rotates through two professors' laboratories, spending approximately one-half semester in each. The selection of laboratories is made by the student in consultation with his/her advisory committee. By taking part in ongoing projects the student will learn experimental procedures and techniques and become acquainted with research opportunities in the participating departments.
Prerequisite: Permission of instructor
Fall and spring, 2 credits each semester

BGE 531 Graduate Student Seminar in Genetics
Seminars are given by graduate students on the current literature in genetics.
Prerequisite: Permission of instructor
Fall and spring, 1 credit each semester

BGE 540 Readings in Genetics
Prerequisite: Permission of instructor
Fall, 1-3 credits, variable

BGE 550 Genetics Seminar
A weekly series of seminars in genetics given by outstanding visiting scientists, supplemented by members of the staff, postdoctoral students and advanced graduate students.
Prerequisite: Permission of instructor
Fall and spring, 1 credit each semester

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

BGE 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 and Biochemistry (BMO)

Chairperson, Department of Biochemistry
Life Sciences Building 450

Graduate Studies Director: Rolf Sternglanz
Life Sciences Building 472 (516)632-8550

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

A. A baccalaureate degree with the following minimal preparation: mathematics through one year of calculus; chemistry, including organic chemistry and physical chemistry; general physics; and one year of biology.

B. Letters from three previous instructors, and the Graduate Record Examination (GRE) General Test 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 and Biochemistry 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 Biochemistry (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: Colloquium in Molecular Biology (BMO 601, 602), which is a series of invited lectures by visiting scientists from other institutions; Student Seminar (BMO 603, 604), in which each student presents a talk on a topic from the current literature; and Molecular Biology Workshop (BMO 605, 606), in which faculty members, postdoctoral fellows and advanced students present informal progress reports on their current research activities.

B. Qualifying Examination

At the end of the first year all students take a written qualifying examination covering the material from the core courses. This examination tests the student's ability to integrate basic concepts and information from the core courses.

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 examination. 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 and biochemistry, 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 extends over a period of three 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

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 animals.

Carlson, Elof A., Distinguished Teaching Professor.[1] Ph.D., 1958, Indiana University: 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.

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

Erk, Frank C., Professor.[1,11] Ph.D., 1952, The 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.[1] Ph.D., 1963, Osaka University, Japan: Biosynthesis and assembly of membrane proteins; molecular mechanisms of protein secretion; mechanisms of gene regulation; morphogenesis of developmental bacteria.

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 immunologic tissue injury.

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: Lipid-protein and protein-protein interactions in membranes; membrane penetration by protein toxins.

Marcu, Kenneth B., Associate Professor.[1] Ph.D., 1975, State University of New York at Stony Brook: Immunoglobulin gene expression and recombination; role of chromosome translocated oncogenes in lymphoid neoplasias.

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, Associate 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: Genetics of malignancy; oncogene structure and expression in human tumors.

Prestwich, Glenn D., Professor.[2] Ph.D., 1974, Stanford University: Bioorganic studies of hormone and pheromone metabolism in insects.

Reinberg, Danny F., Assistant Professor.[1] Ph.D., 1982, Albert Einstein College of Medicine: Nucleic acid enzymology.

Riley, Monica, Professor.[1] Ph.D., 1960, University of California, Berkeley: Macromolecular evolution of the bacterial genome.

Sarma, Raghupathy, Associate Professor.[1] Ph.D., 1963, University of Madras, India: X-ray crystallography; crystal structure and function of proteins and other molecules of biological interest.

Schecter, Nisson, Associate Professor.[1,7] Ph.D., 1971, Western Michigan University: Molecular basis of nerve 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[1] and Senior Biophysicist.[9] Ph.D., 1947, Yale University: DNA damage and repair; carcinogens and radiation.

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., Professor.[2] Ph.D., 1967, Ohio State University: Magnetic resonance studies of transbiomembrane cation distribution and transport.

Sternglanz, Rolf, Professor and Graduate Studies Director.[1] Ph.D., 1967, Harvard University: DNA topoisomerases; DNA replication and gene expression in yeast and bacteria.

Studier, F. William, 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., 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; specific proteinases in diseases.

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

Youvan, Douglas C., Adjunct Assistant Professor[1] and Staff Investigator.[8] Ph.D., 1981, University of California, Berkeley: Molecular genetics and biophysics of bacterial photosynthesis.

Number of teaching, graduate and research assistant, fall 1985: 58.

[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 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 experimental methods used in the study of proteins and nucleic acids, e.g., hydrodynamics, spectroscopy, magnetic resonance and diffraction.
Prerequisites: BMO 520, 521; CHE 301 or 312
Fall, 3 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, 3 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 molecular and cellular biology will be presented. This course is required of all students every semester in which they are registered in Graduate Studies in Molecular Biology and Biochemistry 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 Graduate Studies in Molecular Biology and Biochemistry 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 Graduate Studies in Molecular Biology and Biochemistry 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)632-8616

Graduate Studies Director: Gary G. Matthews
Life Sciences Building 550 (516)632-8616

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 baccalaureate 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 (GRE) General Test and letters from three previous instructors.

D. Acceptance by the department 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 consists of both written and oral parts and emphasizes integration of information from a variety of sources, including courses, seminars and readings.

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., Professor. Ph.D., 1974, London University, England: 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.

Gross, Paul M., Assistant Professor.[7] Ph.D., 1981, University of Glasgow, Scotland: Neural and humoral factors affecting local cerebral metabolism, blood flow and blood-brain barrier function.

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 and Graduate Studies Director. 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 British 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. 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.

Number of teaching, graduate and research assistants, fall 1985: 20.

[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*
[7] *Primary appointment with Department of Neurological Surgery*

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 533 Advanced Seminar in Behavioral Neurobiology
Advanced seminar course centered around selected topics in behavioral neurobiology. Topics include, for example, neuropharmacology, biological rhythms, neuroendocrinology, and neural control of feeding and drinking. Students will be expected to read original literature and deliver oral presentations of material.
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 563 Introduction to Behavioral Neurobiology
A survey of behavioral neurobiology. Topics to be discussed include neurotransmitters and behavior, development and plasticity of the brain, neural control of homeostatic behaviors, and biological rhythms.
Fall, 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 Studies Director: George Hechtel
Life Sciences Building 130 (516)632-8530

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 status. Persons who have not met the grade point average or undergraduate science course requirements will be considered for provisional admission. Provisional status may be removed 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 supervisors.

D. Copies of all previous college transcripts.

E. Applicants are also required to take the Graduate Record Examination (GRE), 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 1 for fall semester; November 15 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 six 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 six (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 three 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 minimum schedule require the consent of the Graduate Studies Director.

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 required.
Prerequisite: 1 year of general biology, or zoology, or zoology-botany
Summer, 3 credits

BIO 561 Human Genetics
This course assumes a knowledge of the fundamentals of general genetics. It focuses upon the study of genes in human kindreds and populations, giving attention to human cytogenetics and

to the importance of genetic factors in human development, disease, society and evolution.
Fall, 3 credits

BIO 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

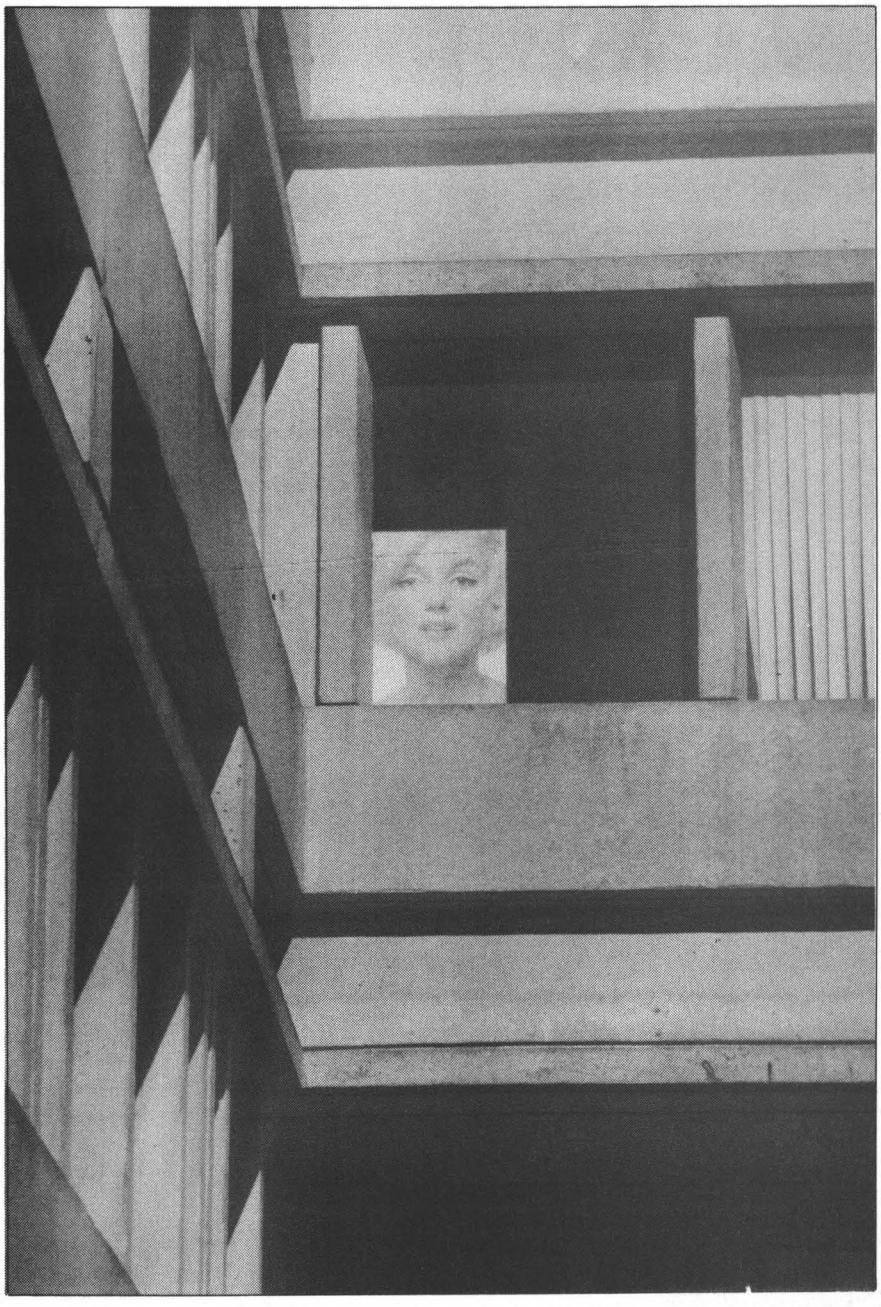
Note: Additional courses are available from the offerings of other graduate programs.

Division of Humanities and Fine Arts

Dean Don Ihde
Library E2340 (516)632-6992

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, Religious Studies, and Theatre Arts; it also contains the Program in Comparative Literature. 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 departments of Art and Theatre Arts offer 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 the 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 performance 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 a Ph.D. emphasizing traditional and contemporary philosophical concerns. The Division of Humanities and Fine Arts thus provides opportunities for concrete linkings between theoretical and applied interests. Details are found in the program descriptions that follow.



Art

(ARH, ARS)

Chairperson: Melvin Pekarsky
Fine Arts Center 2221 (516)632-7260

Graduate Studies Director: James H. Rubin
Fine Arts Center 4213 (516)632-7270

The Department of Art's master's programs in Art History and Criticism and in Studio Art both occupy unique positions among graduate programs in art studies. First, since both are terminal degrees (with no Ph.D. program), academic emphasis and financial aid can be concentrated on students at the entry and intermediate levels of training. Second, rather than being isolated at a special or autonomous institute or school, the programs have the advantages of the traditional environment of a full service university. Students have the opportunity to work in or make contacts in other fields in addition to art history and criticism or studio. Finally, because of the Art Department's undergraduate programs, Stony Brook is the only major graduate university in the New York metropolitan area to offer teaching experience to first- and/or second-year graduate students in art history and criticism or studio. Such experience is an important asset in today's job market.

The number of full-time faculty in the Art Department is average for American universities, but the department has been built with a strong emphasis on modern art, on critical, theoretical, and interdisciplinary interests, and on practical experiences. From this point of view, its strengths and qualifications, as well as its programs, are exceptional. However, while the majority of the faculty are identified with these orientations, a regular complement of courses is offered. Indeed, the Art Department sees its role as one of nurturing and guiding student development and of presenting its fields in their fullest breadth rather than in imposing narrow strictures.

Degree Programs

The M.A. in Art History and Criticism

The M.A. in Art History and 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 theory 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 History and 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.

The M.F.A. in Studio Art

The M.F.A. is a flexible 60-credit terminal degree combining studio work, academic studies, and intellectual theory. It offers three areas of concentration: drawing and painting, printmaking, and sculpture. Courses are also offered in ceramics, ceramic sculpture, and photography. The degree is especially suitable for students who aim at professional involvement in the making of art either as artists, craftsmen, technicians, or art teachers. It may also be the degree of choice for those preparing for careers in arts administration, art education, or gallery and museum work.

In its courses and superlative facilities, the program exceeds national standards for the M.F.A. set by the College Art Association and the National Association of Schools of Art. Its uniqueness stems from the combination of its proximity to New York City, where the faculty have numerous ties, and its major university campus environment. Benefits of this combination are: ample studio spaces, choices of professional apprenticeships and internships, and the cooperation of critics and historians of the Art Department's M.A. in Art History and Criticism faculty, as well as of other departments and programs.

Normally, the M.F.A. requires two to three years full-time residency. Part-time study is permissible subject to the limitations and conditions described below.

Facilities

Since 1976, 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. In addition, the department has more than 7,000 square feet of studio space available at other locations on the campus. Campus libraries contain more than 1,500,000 bound volumes and 2,300,000 publications in microformat, including extensive collections of recent exhibition catalogues and criticism. The department itself publishes a journal titled *Art Criticism,* devoted to the study and practice of art criticism. Proximity to New York City makes available the numerous libraries, museums, galleries, ateliers, and publishing institutions of the greater metropolitan area.

Admission

Admission to the M.A. Program in Art History and Criticism

In addition to the requirements of the Graduate School, the following information and prerequisites should be noted:

Admission for full-time study may be for either the fall or spring semester, though the former is more advisable, both for financial awards and for organizing the course of study. Part-time study is permissible for qualified candidates. Admission into the M.A. program is at the discretion of the Departmental Graduate Studies Committee and with the final approval of the Graduate School. Admission to the program assumes a minimum

of a B average in undergraduate work, meeting the standards of admission to the Graduate School, and taking the Graduate Record Examination (GRE) General Test, as required for all applicants to the Graduate School.

It is recognized that M.A. applicants may come from a wide variety of undergraduate or even graduate backgrounds and require considerable individual structuring of their programs of study to accommodate their specific needs. In addition to the requirements of the Graduate School cited in the preceding paragraph, applicants to the M.A. program should ordinarily have a baccalaureate degree with an art history major or minor. The requirement that the degree be in art history 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 examination, or by taking a specified number of undergraduate courses in the department prior to full admission to the program.

Admission to the M.F.A. in Studio Art

In addition to the requirements of the Graduate School, the following information and prerequisites should be noted;

Admission for full-time study will be for the fall semester only. Part-time study is permissible for qualified candidates, but the final year must be spent in full-time residency. (See Degree Requirements, below.) Admission into the M.F.A. program is at the discretion of the Departmental Graduate Studies Committee and with the final approval of the Graduate School. Admission to the program assumes a minimum of a B average in undergraduate work, meeting the standards of admission to the Graduate School, and taking the GRE General Test, as required for all applicants to the Graduate School.

It is recognized that M.F.A. applicants may come from a wide variety of undergraduate or even graduate backgrounds (B.A., B.S., B.F.A., M.A., or foreign certification) and require considerable individual structuring of their program of studies to accommodate their specific needs.

A. Prerequisites

In addition to the requirements of the Graduate School cited in the preceding paragraph, applicants to the M.F.A. program should fulfill the following prerequisites:

1. All candidates for the M.F.A. program must enter with a minimum of 40 semester hours credit or the equivalent of undergraduate work in studio art in a B.A., B.S., B.F.A., or similar program.
2. The candidate for entrance into the M.F.A. program must submit with his or her graduate application 15-20 slides of work, of which at least four should demonstrate traditional drawing abilities, e.g., figure drawing, perspective, ability to produce finished rendering, etc. In addition, the applicant may be asked to forward original work for evaluation, and, where feasible, may be invited for a personal interview.
3. The candidate for entrance into the M.F.A. progam should have a minimum of 15 semester hours credit in art history, theory, and criticism.

B. Deficiencies

Deficiencies in any of the above areas may be cause for deferment of entry into the M.F.A. program until they are made up—without credit toward the M.F.A. itself—before resubmission by the student for entrance to the program. Such deficiencies and exceptions are subject to evaluation by the graduate art faculty in the light of the entire application for entrance into the M.F.A. program. Decisions by the graduate art faculty on these matters are in addition to, and not in lieu of, the general requirements of the Graduate School of the State University of New York at Stony Brook.

C. Part-Time Study

Part-time students are subject to all of the same admission and degree requirements as those enrolled full-time. Therefore, part-time students must be able to spend the final year in full-time residency. (See Degree Requirements, below.) It should also be noted that the amount of part-time study prior to final residency will be limited to six years.

Degree Requirements

Requirements for the M.A. Degree in Art History and 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 or 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 (3 credits)
   ARH 591 Practicum in the Writing of Art Criticism (3 credits)
   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 or three electives in the Humanities and/or Social Sciences (6-9 credits), to be chosen in consultation and with the approval of the Graduate Studies Director. One of these should be in philosophy; others might be on relevant aspects of literary studies or criticism, history, musicology, sociology, anthropology, etc.
7. ARH 598 Thesis (6 credits).

B. Comprehensive Examination

This test 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 questions designed to test the student's knowledge of the theoretical and critical issues at stake in a particular art. The student must take this examination during the third semester of study in order to continue in the program. An extension will be allowed to part-time students.

C. Foreign Language

A reading knowledge of French or German. Students planning to advance to doctoral work will be encouraged to master both of these 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 ordinarily be an introductory level undergraduate course. 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

During the third semester, the student, together with his or her Directing Committee, which shall consist of the student's advisor and one or two other faculty members, will jointly agree on a thesis topic. The student must at that time submit a prospectus outlining the nature and aims of the thesis. The thesis shall be a significant original work in the form of one or more essays relevant to the examination of art history, criticism and theory.

Requirements for the M.F.A. in Studio Art

A. Areas of Concentration
The candidate for the M.F.A. degree will choose from one of the three areas of concentration in studio art offered by the Department of Art: Painting and Drawing, Sculpture, and Printmaking.

B. Demonstrations of Studio Proficiency
All M.F.A. candidates must demonstrate proficiency in the disciplines of their chosen area of concentration. In addition, M.F.A. candidates in sculpture must demonstrate proficiency in drawing, modelling, carving, and welding. Proficiency is determined by a board of review through an interview and an evaluation of the candidate's progress prior to admission to the final year of studies toward the M.F.A. This review will take place no later than the end of the spring semester before the final year of full-time residency. At this time, the department will notify the candidate in writing as to whether he or she has been accepted for completion of the program, has been found inadequate to the professional standards of the program and has been dropped, or is deficient in some area that must be made up before continuing or completing his or her studies.

C. Final Year Residency and One-Person Exhibition
The final year of study must be taken in full-time residency. During this period, in addition to regular course work, the student will prepare a final one-person exhibition of work. As part of this requirement, the student will submit to the department for its files a 35mm color slide record of the exhibition and a written commentary in depth, by the student, discussing the works, their objectives, etc. (Together, these are commonly known as the M.F.A. "thesis.")

D. Recommended Foreign Language
The department recommends, but does not require, proficiency in a foreign language, preferably French, German, or Italian.

E. Teaching or Internship Requirement
All graduate students are required either to assist in teaching a minimum of one semester, or to choose a graduate internship or apprenticeship, to be arranged by the department. In consultation with his or her graduate advisor and with permission of the department, the student may pursue an internship in addition to the graduate teaching practicum. In such cases, the second course will be counted as one of the required studio courses outside the student's major area of concentration.

F. Course Requirements
The student will be required to complete successfully 60 credits or graduate work, as outlined in the list of courses below. No graduate studio course may be taken for more than three credits per semester.

1. Six Graduate Studio Courses in the major area of concentration (3 credits per course, total 18 credits).
2. Four semesters of ARS 580 Visual Arts Seminar (3 credits per semester, total 12 credits).
3. Three Graduate Studio Courses outside the major area of concentration (3 credits per course, total 9 credits). (See 5, below, for exception.)
4. Four Courses in Graduate Liberal Arts, e.g., art history, languages, literature, philosophy, computer graphics, etc. (3 credits each course, total 12 credits).
5. Either ARS 530 Professional Experience Internship (3 credits), or ARS 531 Graduate Teaching Practicum (3 credits). (If both are taken, the second may be counted as a Non-Major Area Graduate Studio Course. See 3, above.)
6. ARS 532 Thesis Project (6 credits).

Faculty

The faculty of the Art Department consists of artists and scholars of national and international reputation who are actively involved in the practice of art, in art criticism, or in art historical research. The faculty artists' works are represented in major galleries, museums, and exhibitions; the critics and historians are represented by numerous books and articles in major scholarly journals or presses.

Bao, Yee Jan, Assistant Professor. M.F.A., 1971, Claremont Graduate School: Painting and drawing.

Bogart, Michele, Assistant Professor. Ph.D., 1979, University of Chicago: 19th and 20th century American and European art and culture.

Buonagurio, Toby, Associate Professor. M.A., 1971, City College of New York: Ceramics, ceramic sculpture, drawing.

Castedo, Leopoldo, Professor Emeritus. M.A., 1938, University of Barcelona, Spain: Art and architectural history; Latin American art and culture.

Cooper, Rhonda, Director of the Fine Arts Center Art Gallery/Adjunct Lecturer.

Edelson, Michael, Associate Professor. Photography, history and criticism of photography.

Guilmain, Jacques, Professor and Director of Undergraduate Programs. Ph.D., 1958, Columbia University: Medieval art, modern architecture and design, theory of style.

Jonaitis, Aldona, Associate Professor and Associate Provost. Ph.D., 1977, Columbia University: Primitive and Pre-Columbian art and structural anthropology.

Joyce, Hetty, Assistant Professor. Ph.D., 1977, Harvard University. Greek and Roman art and architecture.

Kleege, James, Associate Professor Emeritus. M.F.A., 1945, Syracuse University: Design, welded metal sculpture.

Koras, George, Professor. Diploma, 1955, Athens Academy of Fine Arts, Greece: Modeling, plastic and cast metal sculpture.

Kuspit, Donald B., Professor of Art and Philosophy. Ph.D., 1971, University of Michigan; D.Phil., 1960, University of Frankfurt, Germany: Art criticism, aesthetics, 20th century and Northern Renaissance art.

Larese, Steven, Technical Specialist/Adjunct Lecturer. M.F.A., 1975, University of Cincinnati: Slide curator; painting and drawing.

Levine, Martin, Assistant Professor. M.F.A., 1972, California College of Arts and Crafts: Printmaking.

Mason, Molly, Assistant Professor. M.F.A., 1975, University of Iowa School of Art and Art History: Sculpture and design.

Mallory, Nina M., Professor. Ph.D., 1965, Columbia University: Renaissance, Baroque and 18th century art, architecture and connoisseurship.

Moskowitz, Anita, Associate Professor. Ph.D., 1978, New York University: Medieval and Renaissance art and connoisseurship.

Nash, Stephen, Adjunct Lecturer. M.A., 1982, Royal College of Art, London, England: Anatomical and biological illustration.

Netter, D. Terence, Director of the Fine Arts Center/Adjunct Associate Professor. M.F.A., 1965, George Washington University: Drawing, painting, art and philosophy.

Pekarsky, Melvin H., Professor and Chairperson. M.A., 1956, Northwestern University: Drawing, painting, and public art.

Pindell, Howardena, Professor. M.F.A., 1967, Yale University: Painting and drawing.

Polcari, Stephen, Assistant Professor. Ph.D., 1980, University of California, Santa Barbara: 20th century art and intellectual history.

Rubin, James H., Associate Professor and Graduate Studies Director. Ph.D., 1972, Harvard University: 18th and 19th century art; art and politics.

Thompson, Thomas, Technical Specialist/Adjunct Lecturer. M.F.A., 1969, Ohio University: Photography and filmmaking.

White, Robert W., Associate Professor, part-time. Rhode Island School of Design: Drawing, terra-cotta, stone, and wood sculpture.

Number of teaching, graduate, and research assistants, fall 1985: 9

Art History and Criticism Courses

ARH 510 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 (Winckelmann, 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, ornament and design, 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 more than once 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

Studio Art Courses

ARS 520 Special Projects for M.F.A. Candidates
Advanced projects in areas that may not be included in the M.F.A. curriculum, utilizing the unique talents of regular and visiting faculty, the facilities of the Art Department or other aspects of the University environment, and possibly utilizing facilities at other locations or institutions.
Prerequisites: Faculty sponsor, permission of Graduate Studies Director.
Fall, spring and summer, 1-3 credits

ARS 530 Professional Experience Internship
Internship in the professional art world of New York City and its environs, required of all M.F.A. candidates, in lieu of, or in addition to, the teaching practicum. Depending on the professional objectives of the M.F.A. candidate, the student may choose to intern at a foundry, printmaking atelier, art gallery or museum, known artist's studio or related facility or institution.
Prerequisite: Accepted candidate for M.F.A.
Fall, spring and summer, 1-3 credits

ARS 531 Graduate Teaching Practicum
Supervised teaching practicum in undergraduate studio or studio/theory course.
Prerequisite: Accepted candidate for M.F.A.
Fall and spring, 1-3 credits

ARS 532 Thesis Project
Preparation of thesis under departmental advisor.
Prerequisites: Accepted candidate for M.F.A., review board passed.
Fall, spring and summer, 1-3 credits
(may be repeated once)

ARS 540 Graduate Photo Studio
Photographic studio, theory and laboratory emphasizing individual development as a photographer. Color and black-and-white studios and darkrooms. Fine Arts, Reportage, Illustration, Commercial, Industrial.
Prerequisites: Demonstration of appropriate level of proficiency, permission of instructor.
Once every three semesters, 3 credits

ARS 541 Photographing Works of Art
Graduate-level course for art history and criticism students, studio art students and others examining in detail the techniques of photographing works of art and architecture, and of photo reproduction; black-and-white and color work for portfolio, publication, teaching, cataloguing slide and photograph collections, etc. No laboratory work.
Prerequisites: Art history and criticism, art studio or other graduate standing or permission of department.
Once every three semesters, 1½ credits

ARS 550 Graduate Drawing Studio
Graduate theory and practice of drawing; investigations of historical and contemporary concepts of drawing, with concentration on individual development as an artist. Models, space for conceptual and environmental works, and other wide-ranging facilities available.
Prerequisite: Accepted candidate for M.F.A. or permission of department
Once every three semesters, 3 credits

ARS 551 Graduate Painting Studio
Studio and theory in painting and related visual forms, with instruction and facilities available in all media and techniques: emphasis on individual development as an artist. Models and space for environmental and conceptual works available.
Prerequisites: Permission of instructor; accepted candidate for M.F.A. or permission of department
Fall and spring, 3 credits

ARS 560 Graduate Sculpture Studio
Theory and practice of sculpture for the graduate student. Advanced studio instruction in heavy construction techniques including air, electric and hydraulic power equipment; MIG, TIG and flame welding. Forging and woodworking. Modeling and molding techniques in clay, wax, plaster and plastics; casting, laminating and vacuum forming. Metal-casting capabilities include investment, shell, sand and centrifugal. Hand and power carving in wood and stone.
Prerequisites: Permission of instructor; accepted candidate for M.F.A. or permission of department
Fall and spring, 3 credits

ARS 561 Graduate Ceramics and/or Ceramic Sculpture Studio
Theory and practice of ceramics and ceramic sculpture for the graduate student. Advanced studio instruction in handbuilding: coil, slab, pinch; wheelthrowing; casting, inclusive of multipiece plaster pour-molds; various firing techniques; reduction; oxidation; high-and-low fire overglaze techniques.
Prerequisites: Permission of instructor; accepted candidate for M.F.A. or permission of department
Once every three semesters, 3 credits

60

ARS 570 Graduate Printmaking Studio
Graduate studio in the theory and practice of printmaking. Color, black-and-white and photographic processes in plate and stone lithography, serigraphy, relief and intaglio, emphasizing the student's individual development as an artist.
Prerequisites: Permission of instructor; accepted candidate for M.F.A. or permission of department
Fall and spring, 3 credits

ARS 580 Visual Arts Seminar
Required seminar and critique throughout the M.F.A. curriculum. Guest speakers, artists and critics; demonstrations and lectures; seminars; individual and group critiques. The M.F.A. candidate will, as part of this seminar, regularly participate in critiques in which his or her work is analyzed by faculty, art history/criticism faculty, and art history/criticism graduate students, as well as by his or her peers. The Visual Arts Seminar will, where applicable, include field trips and assignments of special lectures, panels, seminars and other events of the professional art world.
Fall and spring, 3 credits

ARS 591 Graduate Design Studio
Graduate theory and practice of two- and three-dimensional design; projections; perspective; maquettes; various techniques, including airbrush and experimental, conceptual development of ideas, leading to completion of a design idea or design research project.
Prerequisite: Permission of instructor
Once every three semesters, 3 credits

Comparative Literature

(CLG)

Chairperson: Robert Goldenberg
Frank Melville, Jr. Memorial Library E4339 (516)632-7460

Graduate Studies Director: D. Sandy Petrey
Frank Melville, Jr. Memorial Library N4309

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 Graduate Studies Committee and not to be used to fulfill any specific M.A. degree requirements.

In all cases, admission is by action of the Graduate Studies 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 Studies 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 (GRE) General Test scores.

D. Two course papers in literature or another appropriate field.

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. Students must ultimately be competent in one major and one minor language (non-native speakers of English may offer English as one of the two languages). All students must have passed their language requirements before they are allowed to take the M.A. examination. To demonstrate competence in the major language, students must take for credit, and earn a grade of B or better in, at least one graduate or advanced undergraduate literature course conducted in the language (final papers may be written in English). Competence in the minor language can be demonstrated by (1) earning a grade of B or better in a graduate translation or language course such as CLT 520 or a graduate translation course in a foreign language department; or (2) passing a CLT examination to be taken with a dictionary. (For details see the Department Handbook.)

C. M.A. Examination

The student will take a written master's examination in the first or second year of graduate study. The exam measures 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

Students may choose to demonstrate competence in either *two* major foreign languages, or *one* major and *two* minor

languages for the Ph.D. For options to demonstrate competence, see "Foreign Language Requirement" under the master's degree heading and consult the Department Handbook.

C. Comprehensive Examination

Full-time students who are candidates for the Ph.D. will normally take an oral comprehensive examination no more than one year after completing their coursework. All language requirements must be completed at least three months before the comprehensive examination. Each student will have a committee of five faculty members who can examine the candidate in one or more areas of the comprehensive examination, and who will assist the candidate in preparing a reading list for the examination. The examination consists of four parts: literary theory and its history, a literary genre, a period of literary history, and a special area of comparative nature related to the student's plan for the dissertation. (For more details see the Department Handbook).

D. Dissertation

The dissertation represents the culmination of the student's degree program and should be a serious contribution to scholarship. Candidates choose their dissertation director and the Dissertation Committee in consultation with the Chairperson and the Graduate Studies 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 five 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 five 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

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.

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. 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.

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

Petrey, D. Sandy, Professor and Chairperson. Ph.D., 1966, Yale University: Realistic fiction; theories of the novel; 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 and Graduate Studies Director. 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.

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

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.

Sprinker, Michael, Associate Professor. Ph.D., 1975, Princeton University. History and theory of criticism; history of the novel; Marxism.

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., 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 theatre: contemporary French theatre; Proust; European Romanticism; Goethe.

Number of teaching, graduate and research assistants, fall 1985: 15

Courses

CLT 500 History of Literary Theory I: Plato to Kant
The basic texts in literary criticism from Plato to Kant. Stress will be placed on the 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
The important developments in literary theory in the 19th and 20th centuries. Attention will be given to the influence of other disciplines such as psychology and linguistics; theorists considered include Coleridge, Hegel, Nietzche, Richards, Eliot, Auerbach, Frye.
Spring, 3 credits

CLT 502 Translation Theory
After an overview of the history of translation theory, students will study recent work to gain familiarity with the existing translations of works in their period of specialization.
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 520 Problems in Translation
After studying translation theory, students will translate a literary text. May be repeated for credit in different languages.
Fall and spring, 3 credits

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

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

CLT 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 and spring, variable and repetitive credit

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

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

English
(EGL)

Chairperson: David Sheehan
Humanities Building 255 (516)632-7420

Graduate Studies Director: Don Bialostosky
Humanities Building 194 (516)632-7373

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 and evening 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 February 1. Applicants who cannot meet these deadlines should seek the guidance of the 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 (GRE) General Test, required of all students by the Graduate School.

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 M.A. Program in English

For applicants to the Ph.D. program, 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 GRE 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.

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 10 three-credit graduate courses, competence in one foreign language, and passing the master's examination. Of these 10 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 these requirements. The required 10 courses must be distributed among at least four of the following six areas with at least one course in American literature:

1. Old and 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. Students register for a total of nine credits toward completion of this project.

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 11 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 coursework 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 (Classical Backgrounds of English Literature) and EGL 611 (Contemporary Critical Theory). Because these seminars provide essential contexts for later study, students must take them in their 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 Graduate Studies Director 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 Studies 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 examinations 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 Graduate Studies Director 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 Studies

Director in consultation with the committee chairperson.

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 dissertation director and two other members of the department who will serve as readers. After the student's director has conferred with the other readers and the Dissertation Committee has approved the proposal, the director will submit the proposal and names of the committee members to the Graduate Program Committee of the department for its approval. The Graduate Studies Director in consultation with the student's Dissertation Committee will name a reader from outside the department.

The four readers of the dissertation must recommend acceptance of the dissertation before it can be approved by the Graduate School. Students will present the results of dissertation research at a colloquium convened for that purpose by the Department of English, which will be 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 EGL 699, Directed Reading for Doctoral Candidates, for three, six, nine 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 Graduate Studies Director 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 the 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 Graduate Studies Director in English.

Faculty

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

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

Bialostosky, Don, Associate Professor and Graduate Studies Director. Ph.D., 1977, University of Chicago: British romantic literature; Wordsworth; literary criticism and theory.

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 Emeritus. 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.

Fontaine, Sheryl, Assistant Professor. Ph.D., 1984, University of California, San Diego: Rhetoric and composition.

Fortuna, Diane, Assistant Professor. Ph.D., 1967, The Johns Hopkins University; 20th-century British and American literature; 19th-century American literature.

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., Associate 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, 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.

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

Levine, Richard A., Professor. 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; women's studies.

Newlin, Paul, Associate Professor.[4] 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, Professor. Ph.D., 1959, Harvard University: The 17th century; Shakespeare.

Rogers, Thomas, Associate Professor Emeritus. 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 and Chairperson. Ph.D., 1974, University of Wisconsin, Madison: The Restoration and the 18th century; Swift.

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, Associate Professor. Ph.D., 1977, Stanford University: 19th- and 20th-century British literature; women's studies; Virginia Woolf.

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, 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 1985: 50

[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.*
[4] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1984-85. Recipient of the President's Award for Excellence in Teaching, 1984-85.*

Courses

All courses are for three credits, except where noted with an asterisk. 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 (Classical Backgrounds of English Literature)**
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 (Contemporary Literary Theory)**
EGL 612 **Theories in Composition**
EGL 613 **Research in Composition**
EGL 614 **Topics in Composition and Writing**
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: Mark Whitney
Frank Melville, Jr. Memorial Library 4005 (516)632-7440

Graduate Studies Director: Mario B. Mignone
Frank Melvillè, Jr. Memorial Library 4003 (516)632-7444

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 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 Graduate Studies Director, students may obtain six 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 as well.

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.

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, and 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 GRE 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.

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 GRE 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 GRE 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. FRN 507 Advanced Stylistics	3
FRN 508 *Explication de Texte*	3
Six courses in Literature	18
2. Electives: Two courses of which one, FRN 501 Contemporary French Culture and Institutions, 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 Concentration in Literature**

A. Course Requirements

	Credits
1. ITL 501 Contemporary Italy or one course in Romance Philology or Linguistics	3
ITL 508 Advanced Grammar and Stylistics	3
ITL 511 History of the Italian Language	3
Six courses in Literature	18
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 Concentration in Language**

A. Course Requirements

	Credits
1. ITL 501 Contemporary Italy, ITL 502 Italia in Transizione	6
ITL 505 Strategies for Teaching Italian or any Romance Philology or Linguistics course	3
ITL 508 Advanced Grammar and Stylistics	3
ITL 511 History of the Italian Language	3
Three courses in Literature	9
2. Electives	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 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 concentration in literature, or Track II with a concentration in language.

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

- **Track I—French/Italian with Concentration in Literature**

A. Course Requirements

Major in French*

1. FRN 501 Contemporary French Culture and Institutions
   FRN 507 Advanced Stylistics
   FRN 508 *Explication de texte*
2. At least 15 credits in literature with concentration in two fields

Minor in Italian**

3. ITL 501, ITL 508
4. Two literature courses to be chosen with permission of advisor

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Major in Italian*

1. ITL 501 Contemporary Italy or ITL 502 Italia in Transizione
   ITL 508 Advanced Grammar and Stylistics
   ITL 511 History of the Italian Language or one course in stylistics
2. At least 15 credits in literature with concentration in two fields

Minor in French**

3. FRN 501 or 508, FRN 507
4. Two literature courses to be chosen with permission of advisor

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

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

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).

• Track II—French/Italian with Concentration in Language

A. Course Requirements

Major in French*

1. FRN 501 Contemporary French Culture and Institutions
   FRN 507 Advanced Stylistics
   FRN 508 *Explication de Texte*
   3 credits in approved Linguistics 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**

3. ITL 501
   ITL 508
4. Two literature courses in the area of concentration

Major in Italian*

1. ITL 501 Contemporry Italy
   ITL 508 Advanced Grammar and Stylistics
   3 credits in approved Linguistics 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 French**

3. FRN 501
   FRN 507
4. Two literature courses in the area of concentration

B. Performance
Average grade 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.

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

• French/Spanish

A. Course Requirements

French	*Credits*
1. FRN 501 Contemporary French Culture and Institutions	3
FRN 507 Advanced Stylistics	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
Approved Linguistics elective	3
Total	21

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

   a
   1. 20th Century
   2. 19th Century
   3. Theatre
   4. Prose Fiction, *or*
   5. Lyrics (6 credits)

   b
   1. French Baroque, Classical Theatre, and Spanish Golden Age, *or*
   2. Medieval (6 credits) — 12

3. Elective — 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.

• Italian/Spanish

A. Course Requirements

Italian	*Credits*
1. ITL 501 Contemporary Italy	3
ITL 508 Advanced Grammar and Stylistics	3
ITL 511 History of the Italian Language or Linguistics course	3
Approved Linguistics elective	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 (four courses) in literature in two areas of concentration (6 credits). The student will select two areas of concentration and will take 6 credits (two courses) in each of them, three in Italian and three in Spanish. One area will be chosen among group a, and the other from group b:

   a
   1. 20th Century
   2. 19th Century
   3. Theatre
   4. Prose Fiction, *or*
   5. Lyrics (6 credits)

   b
   1. Italian Renaissance, Baroque and Spanish Golden Age, *or*
   2. Medieval (6 credits) — 12

3. Elective — 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 defining 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

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 candidate has completed all coursework and has been reviewed by the doctoral committee which will make final determination for conferral of the degree of Doctor of Arts in Foreign Language Instruction.

Faculty

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

Bieber, Konrad, Professor Emeritus. Ph.D., 1953, Yale University: Contemporary French literature; 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.

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

Forti-Lewis, Angelica, Assistant Professor, Ph.D., 1984, University of Pennsylvania: 18th- and 19th-century Italian literature; history of genres and comparative 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.

Kapuscinski, Gisele, Assistant Professor. Ph.D., 1982, Columbia University: Linguistics; French theatre.

Laidlaw, G. 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 theatre.

Mills, Leonard R., Associate Professor Emeritus. 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 theatre; French films.

Rizzuto, Anthony, Associate Professor. Ph.D., 1966, Columbia University: 19th- and 20th-century literature.

Toscano, Antonio, Assistant Professor. Ph.D., 1976, Rutgers University: Renaissance Italian literature.

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

Whitney, Mark, Professor and Chairperson. 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 1985: 8.

[1] *Recipient of the State University Chancellor'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.
Fall or spring, 3 credits

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

FRN 504 The French Language and New Technologies
A course designed to meet the demands of the changing field of French language instruction. Students will participate in language classes where specially edited video cassettes and authentic written documents will foster aural comprehension, vocabulary acquisition and cultural awareness. This approach will serve as a model for French language instruction at all levels. Students will receive some basic training in video techniques and will be asked to produce some original video material, based on one or several aspects of French life. They will use portable units of the "Office Audio-Visuel" of the University of Poitiers, and their productions will subsequently be edited and transcoded for use in U.S. schools. For secondary teachers of French.
Alternate years, 3 credits

FRN 506 The French Scene II (French Immersion Institute in Poitiers)
Along with visiting the Loire valley, La Rochelle, Poitiers, Poitou province, and Paris, participants will attend civilization classes and a number of seminars on contemporary France and fran-

cophone countries. They will be asked to prepare their own "authentic documents," using newspapers, radio broadcasts, interviews, and other field work. Duplicating facilities will be made available by OAVUP (Office Audio-Visuel de l'Universite de Poitiers). Designed for secondary school teachers of French and other qualified students.
Alternate years, 3 credits

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

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

FRN 509 Introduction to Bibliography
Students will acquaint themselves with library resources, organization, reference materials, catalogues, and computer access. Each student is to compile a bibliography on a topic related to his or her special field of interest.
Spring, 1 credit

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.
Fall or spring, 3 credits

FRN 514 Seminar in Medieval French Literature
This course may be repeated for credit when topic changes. Topic to be arranged.
Fall or spring, 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.
Fall or spring, 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.
Fall or spring, 3 credits

FRN 541 Studies in 18th-Century French Literature
The intellectual and political atmosphere in France since the end of the 17th century. The rise of the philosophic spirit. *Philosophes* and society. The battle around the *Encyclopedie*. Impact of this new spirit on the French Revolution.
Fall, 3 credits

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

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

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

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

FRN 581 Independent Individual Studies
Fall and spring, 1-6 credits, repetitive.

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.
Fall or spring, 3 credits

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

ITL 502 Italia in Transizione
This course will examine the impact on Italy of new issues such as feminism, and of unresolved problems such as that of the underdeveloped South, from 1968 to the present. Readings will come from leading Italian daily newspapers and newsmagazines, as well as from books dealing with individual problems. Completion of one research project required.
Spring, alternate years, 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.
Fall or spring, 3 credits

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

ITL 509 Contrasting Italian and English
This course seeks to isolate and analyze interference patterns in English-speaking persons learning the Italian language, on all levels — phonetic, morphological, syntactic, and lexical. It should be especially desirable for those planning to teach the language to native English speakers.
Prerequisite: Good knowledge of Italian
3 credits

ITL 511 History of the Italian Language
A study of the development of the Italian language beginning with its origins in Latin, through the vulgate (dialects) and finally as an outgrowth of Tuscan.
Spring, alternate years, 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 13th-14th century Italy.
Fall and spring, 3 credits

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

ITL 522 Seminar in Italian Humanism and Renaissance Literature
Analysis of the works of such writers as Petrarch, Boccaccio, Ariosto, Machiavelli, Castiglione, 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.
Fall or spring, 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.
Fall or spring, 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. This course may be repeated when the topic changes.
Fall or spring, 3 credits

Modern Literature
Decadentism, Futurism, new Realism, new Avant-garde considered as expression of a total cultural experience through discussion of work of authors such as: Svevo, Marinetti, Pirandello, Moravia, Pavese, Victtorini, Montale, Ungaretti, Quasimodo and others. Specific topics will be on poetry, fiction and theatre. Note: Course may be repeated with a different topic.
Fall or spring, 3 credits

ITL 571 Italian Autobiography
A study of the development of introspection and of self-awareness in Italian autobiography from Petrarch to the 20th century.
Fall or spring, 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 N3011 (516)632-7360

Graduate Studies Director: Christina Bethin
Frank Melville Jr. Memorial Library N3089 (516)632-7360

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 (GRE) 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 in foreign language instruction 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. 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 GRE 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 independent study under the tutorial and seminar programs.

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

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

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.

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

D. Dissertation Subject
A candidate must present a proposal for a 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 are 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.

Faculty

Bethin, Christina Y., Associate 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 1985: 10

[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 an 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 558 Middle High German
An introduction to Middle High German grammar with representative reading from the Middle High German classics.
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 excerpts from the Bible.
Fall or spring (as feasible), 3 credits

GER 565 Middle High German Literature
An introduction to German literature of the high courtly period (1150-1250). Among genres discussed will be the courtly romance, the heroic epic and the *Minnelieder.*
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
An intensive introduction to Russian for non-majors. Practice in reading and translation of selected Russian texts and technical literature. As much attention as possible will be given to special problems of various disciplines.
Spring, 3 credits*

RUS 502 Problems of Literary Translation
Replaced by SLV 502.

RUS 504 Russian Culture
Replaced by SLV 504.

RUS 506 Stylistics of Russian
Advanced stylistic and textual analysis of the diverse styles of the Russian language: journalistic, literary and technical.
Fall, 3 credits*

RUS 507 Gogol and the Grotesque
Gogol's style and language explored as an expression of his world view and ethos. Influence of Gogol's style on Russian literature and on Western genres, such as the short story and the Theatre of the Absurd.
Spring, 3 credits*

RUS 509 Dostoevsky and the West
Dostoevsky's major texts viewed in cross-cultural perspective with particular emphasis on literary and philosophical traditions common to Russia and Europe. Cross-listed with CLT 504.
Fall, 3 credits*

RUS 512 Early 20th-Century Russian Literature
An introduction to the various schools which characterize the pre-Revolutionary period of 20th-century Russian literature—Symbolism, Acmeism and Futurism. Particular emphasis is placed on the works of Blok, Sologub, Axmatova, Mandelstam, Pasternak, Esenin and Mayakovsky.
Fall, 3 credits

RUS 514 Russian Literature Since 1917
A seminar in Soviet post-Revolutionary and emigre prose. The course deals with Russian prose fiction—such as prose genres, literary movements, and major authors such as Bulgakov, Pasternak and Solzhenitsyn.
Fall, 3 credits

RUS 517 History of the Russian Literary Language
This course discusses the development of the Russian literary language from the 10th century to the present. Although its emphasis is primarily on the historical development of the language, the course includes readings from early East Slavic and Middle Russian texts, 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 focuses on Russian literature from the 11th to the 18th centuries and investigates the relationship between the changing worldview of pre-19th-century Russia and the literary genres, styles and symbols of different periods. Discussions will include analysis of such major works as the *Chronicles, The Tale of Igor's Campaign, The Life of Avvakum,* the verses of Simeon Polotsky, and others.
Fall, 3 credits*

RUS 520 Applied Linguistics
An advanced practical course in Russian syntax, idiomatic phraseology and word order.
Fall, 3 credits*

RUS 538 Structure of Russian
The course investigates the phonetics, phonology and morphology of Contemporary Standard Russian.
Fall, 3 credits*

RUS 539 Teaching Strategies in Russian
An investigation of the methodology and materials available to teachers of Russian. The course examines 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.
Fall or spring, 3 credits*

RUS 571 Introduction to Slavic Linguistics
Replaced by SLV 571.

RUS 602 Literature and Theatre
The relationships of literature and theatre with specific 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 an author, period, genre, or theoretical issue. Designed to provide a forum for advanced research in critical methodology.
Spring, 3 credits

SLV 502 Problems of Literary Translation
The course addresses theoretical and practical problems of translation from the Slavic languages. Published translations of literary texts as well as translations prepared by participants of the seminar will be compared and analyzed.
Prerequisite: Advanced knowledge of Slavic language.
Spring, 3 credits*

SLV 503 Special Topics 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 or the phonology, morphology or syntax of a given Slavic language.
Spring, 3 credits

SLV 504 Topics in Slavic Cultures
Replaces RUS 502. The course examines major topics in Slavic cultures and focuses on Slavic contributions to Western civilization.
Fall, 3 credits

SLV 571 Introduction to Slavic Linguistics
Replaces RUS 571. An investigation of the major West, East and South Slavic languages with particular attention to their historical development. The course includes comparative and contrastive studies in the areas of phonology, morphology and syntax.
Fall, 3 credits

**Offered alternate years.*

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: Roman de la Campa
Frank Melville, Jr. Memorial Library N3022-3023 (516)632-6950/6935

Graduate Studies Director: Adrian G. Montoro
Frank Melville, Jr. Memorial Library N3027 (516)632-6943/6935

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 in foreign language instruction 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 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 (GRE) General Test 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 Program in Foreign Language Instruction

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

A. A completed application form and 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 GRE General Test 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 GRE General Test 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 Graduate Studies Director in order to plan a broad program of reading and coursework in all areas offered by the department.

Degree Requirements

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, advanced language and problems in bilingual education are recommended.

D. Students 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. As many as six credits may be earned by completing a special project, thesis and/or examination.

C. Student must demonstrate proficiency in English and in the languages of the Interdepartmental degree.

Requirements for the Doctorate 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 coursework, 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

Students must complete one course in Spanish historical linguistics and four 600-level seminars. A student's course curriculum must show at least one course each in Cervantes, Spanish-American Modernism, and Literary Theory (at the 500 or 600 levels). Specializations are offered in Spanish or Spanish-American literature.

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 36 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 (18 credits) at Stony Brook.

Teaching experience and one practicum is required and may be counted as part of the student's full-time study. Undergraduate courses may also be considered as part of full-time study, but without graduate credit. Before registering for each semester, the student must consult with the Chairperson and/or the Graduate Studies Director 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 either after their first or their third full-time semester, according to individual qualifications. This examination, usually given in February, is based on a list of five literary works, and serves to indicate preparation and aptitude for doctoral work in Spanish. It consists of a written part (four 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

When the student has completed one of the department's two standard reading lists (emphasis on either Peninsular literature or Spanish-American literature), he or she may take the first part of his or her comprehensive (preliminary) examination. However, the student must first pass the mandatory linguistics course, have a reading knowledge of French, and possess no outstanding incomplete grades.

This examination will consist of nine hours of written work and one hour of oral questions and answers. The written examination will be given on two days of the same week. One day, six hours will be devoted to the area of specialization; on the second day, the other area will be covered in three hours. (No less than one week or more than one month shall pass between the written and the oral parts).

The second part of the comprehensive (preliminary) examination—a discussion of the dissertation topic—is usually combined with the oral examination. If not, it must be presented within six months of the first section of the written examination. It is planned by the student in consultation with the prospective director of his or her dissertation. (Both language requirements must have been fulfilled by this time). A specialized bibliography of relevant works is drawn up by the director in conjunction with the student. The student then drafts a thesis prospectus to be presented with the bibliography to the department at large and to his or her Examination Committee. An oral examination lasting at least one hour, based on the bibliography and thesis prospectus, must be satisfactorily passed before the student can be advanced to doctoral candidacy.

E. Dissertation

The qualified doctoral candidate will concentrate on a dissertation (written results of specialized study and research) under the supervision of a member of the graduate faculty, with advice of a second reader.

At least six weeks before his or her scheduled dissertation defense, an open draft must be submitted for advice and discussion to the Dissertation Committee. After the dissertation is completed, a final

draft is submitted to this committee, accompanied by a dissertation abstract. If the dissertation is approved by the committee, the candidate is recommended for the Doctor of Philosophy degree, and is usually asked to give a public lecture on the subject of the dissertation.

Faculty

De la Campa, Roman, Associate Professor and Chairperson. Ph.D., 1975, University of Minnesota: Ideology in literature and criticism; Latin American and Caribbean literature; books on contemporary Cuban theatre 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. 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: Linguistic meaning, 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 and Graduate Studies Director. 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.

Nunes, Maria Luisa, Associate Professor. Ph.D., City University of New York: 19th- and 20th-century Luzo-Brazilian literature. Portuguese and women's studies: The Crypt of an Absolute Winner; characterization and narratology in the novels of Machado de Assis.

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. Ph.D., 1969, The 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.*

Number of teaching, graduate and research assistants, fall 1985: 26.

Courses

SPN 501 Historical Linguistics I
General processes of language change, as exemplified by the development of the Romance languages with particular reference to Spanish.
Prerequisite: B.A. degree and one semester of linguistics.
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 504 Contrastive Analysis: Spanish and English
Course intended to develop students' ability to (1) analyze language for themselves, through systematic observation of actual usage; and consequently (2) exercise critical judgment in using existing pedagogical materials (language textbooks). Topics addressed include linguistic interference: its basis and its manifestations; in-depth discussion of specific syntactic/semantic areas with reference to possible Spanish/English interference; major phonological differences between Spanish and English and consequent learning difficulties; non-linguistic factors which may affect learning in different groups (e.g. children vs. adults, United States traditions vs. Hispanic traditions) in different situations.
Prerequisite: B.A. degree
Fall or spring, 3 credits

SPN 505 Seminar in Hispanic Linguistics
Dialectology and sociolinguistics: Hispanic varieties. The course is intended to familiarize students with major theoretical issues involved in analysis of geographic and social variation and with the principal methods used in its investigation, as applied to varieties of Spanish, Portuguese and Catalan. Semantic analysis: Discussion of different theoretical approaches and their implications for the analysis of syntactic and pragmatic phenomena in Hispanic languages. Students will be required to complete an original research project.
Prerequisite: Two semesters of linguistics and permission of instructor
Fall or spring, 3 credits, repetitive

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 credits, 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.
Prerequisite: 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 explored.
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, 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 580 Poetry Workshop in Spanish
This course is designed to maximize the interchange between faculty teaching the course, and graduate student poets who have written in the genre and are already familiar with the theoretical works of Ruben Dario, Octavio Paz, Enrique Lihn and others. The theoretical and practical study of poetry in Spanish will enhance the development of students' writing skills and skills of critical analysis.
Prerequisite: Permission of department based on student's original works
Fall and spring, 1 credit, repetitive up to 3 credits

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 one another in order to gain insights into their similarities and 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 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 Graduate Studies Director or instructor
Fall and spring, 1-6 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 Graduate Studies Director and the Departmental Chairperson. No more than a total of nine credits may be applied for graduate work.
1-6 credits

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: Coursework 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 methodology and linguistics to classroom situations. A required course for teaching assistants.
Prerequisite: Permission of Graduate Studies Director
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 to preparation of their theses.
Prerequisites: 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: Richard Kramer
Fine Arts Center 3307 (516)632-7330

Graduate Studies Director: David Lawton
Fine Arts Center 3310 (516)632-7330

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. The department also offers programs leading 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. Results of the Graduate Record Examination (GRE) 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 GRE 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 requirements of 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. The audition in harpsichord will include continuo realization.

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

E. Scores of the GRE General Test.

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

Entering students, except those in conducting, will be examined in ear training during the week before the beginning of classes.

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. While acceptance into the program is based primarily upon excellence in performance, the program contains a significant academic component. Applicants are therefore invited, but are not required, to submit examples of their work in music history or music theory. One or two essays completed as coursework in either area would be appropriate. Other evidence of such work—exercises in composition or analysis, for example—would be welcome as well.

Students who do not possess 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 Studies 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 Studies Director by February 1 for fall admission. The application should be accompanied by examples of work and letters of recommendation.

Students who do not possess 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 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 Composition

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. 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 departmental requirement 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 15 credits in individual study of the major instrument or voice may be counted toward the degree. None of the remaining 15 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 and harpsichordists during each semester of full-time residence. Students in harpsichord are expected to participate in the Collegium Musicum for two semesters. 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 E, below) is given.
3. For students in harpsichord, the examinations will include continuo realization.

D. Foreign Language
A reading knowledge of French or German is required of students in harpsichord.

E. 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 Graduate Studies Director. 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 years of full-time residence.

A. Work in the Student's Area of Specialization
Progress during residence in the program will be demonstrated to the Directing Committee through the presentation of four recitals, not including the doctoral 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
See the description of MUS 696.

C. Essays
Two papers, one on an analytical topic, and 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 20th-Century 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 20th-century music. Participation in MUS 611 resulting in a significant performance may satisfy this requirement in part.

E. Foreign Language
A reading knowledge of French, German or Italian is required. Students in harpsichord must read both French and German. 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 and harpsichordists 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, 30-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 Graduate Studies Director.

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 Graduate Studies Director 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 20th-Century Music:
Competence is to be demonstrated to the Directing Committee through the following:

1. An essay dealing with 20th-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 20th-century music. See the description of MUS 696.

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 colloquium on the dissertation work(s).

Faculty

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; 20th-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.

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, Professor. 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, Moscow 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.

Haas, Arthur, Performing Artist in Residence. M.A., 1974, University of California, Los Angeles: Harpsichord; performance of early music.

Kalish, Gilbert, Professor. B.A., 1956, Columbia University: Piano; chamber music; 20th-century piano repertory.

Kramer, Richard, Associate Professor and Chairperson. Ph.D., 1974, Princeton University: 18th-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; 20th-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. 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, Professor and Associate Graduate Studies Director. B.S., 1946, Juilliard School of Music: String Bass; chamber music.

Lochhead, Judith, Assistant Professor. Ph.D., 1982, State University of New York at Stony Brook: Theory and history of recent music; phenomenology and music; performance and analysis.

Mount, Timothy, Assistant Professor and Director of Choral Music. D.M.A., 1981, University of Michigan: Choral conducting.

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; 20th-century wind performance.

Rosen, Charles, Distinguished Professor. Ph.D., 1961, Princeton University; D. Mus., H.C., 1976, Trinity College, Dublin, Ireland; D. Mus, H.S., 1977, University of Leeds, England: Classical and Romantic music; music of the 20th-century; criticism in art, music and literature; piano.

Rubin, Amy, Lecturer. M.Mus., 1975, Yale University: Musicianship.

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; 20th-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; 20th-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 1985: 76

[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 the 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/D.M.A. students, except for conducting students who can demonstrate graduate-level ability in an instrument or voice.
Fall and spring, 2-3 credits

Note: Not more than eight 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; tonalality; 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 receive individual private instruction, and will be expected to participate in the rehearsing of the University Chorus, the University Chorale and the Chamber Singers. Open only to students enrolled in graduate conducting programs.
Fall and spring, 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 Instrument or Voice
A study of the solo works of the 20th century, with emphasis on performance techniques and problems. The instructor will be a teacher of the specific instrument in each case, except his or her section may be open to students of certain other instruments with his or her permission. Not offered each semester in every instrument.
Fall and spring, 2 credits each semester

MUS 585 Renaissance and Baroque Brass Performance Practice
Study and survey of original and transcribed Renaissance works, and of various Baroque works, for brasses. Investigation of styles and techniques of Renaissance ornamentation using mainly Ganassi's Fontegara (1535) as text. Investigation of Baroque ornamentation styles and symbols.
Fall, 2 credits

MUS 591 Practicum in Teaching
Instruction in the department under the supervision of the faculty. (MUS 591 may not be included in the courses taken in fulfillment of degree requirements.)
Fall and spring, 1-3 credits each semester

MUS 592 Semester on the Teaching of Music
Discussion of fundamental problems in teaching music. Topics may include the explanation of musical processes, communication to non-professionals, integration of aspects of performance, theory, history or analysis with one another. Required of all students who teach one of the introductory undergraduate courses in musicianship, theory or literature; to be taken during the first semester of teaching.
Fall, 1 credit

MUS 595 Chamber Players
The Graduate String Quartet, the Graduate Brass Quintet, the Graduate Wind Quintet and the Graduate Piano Trio, specially appointed groups, work under the direction of a member of the performance faculty and present concerts and workshops at the University and elsewhere.
Fall and spring, 3 credits each semester

MUS 599 Independent Studies
Individual studies under the guidance of a faculty member. Each student must submit to the Graduate Studies Committee of the department a written prospectus of the work he or she intends to pursue, with the amount of credit proposed, together with the written endorsement of the prospective instructor. Approval of the Graduate Studies Committee is required; hence this material should be submitted as soon as possible, and in any case within the first two weeks of the semester (or the first week of a summer session).
Fall and spring, variable credit

MUS 602 Music and Other Disciplines
An interdisciplinary seminar which will be offered from time to time with members of other graduate departments, on topics to vary from semester to semester.
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 696 Doctoral Colloquium
Students are required to enroll in MUS 696 in a semester prior to the one in which the Ph.D. colloquium or the D.M.A. lecture-recital is given. The instructor, chosen in consultation with the Directing Committee, will act as an advisor or tutor, and will signal to the Graduate Studies Committee that the colloquium or lecture-recital may be given.
Fall and spring, 1 credit

MUS 697 Directed Reading
Intended for preparation for the preliminary examinations and related requirements.
Fall and spring, 1-12 credits each semester, repetitive

MUS 698 Directed Dissertation Research
Intended for work in the area of the dissertation.
Fall and spring, 1-12 credits each semester, repetitive

Philosophy
(PHI)

Chairperson: Donn Welton
Harriman Hall 209 (516)632-7590

Doctoral Program Director: Sidney Gelber
Harriman Hall 217

Master's Program Director: Marshall Spector
Harriman Hall 219

The Department of Philosophy offers programs leading to the Master of Arts in philosophy with Graduate Studies in Philosophical Perspectives, and to the Doctor of Philosophy. The two programs differ in content and purpose.

Graduate Studies in Philosophical Perspectives (master's level, MA/PP) emphasizes current moral, social and political problems and involves an exploration of important issues in education, law, medicine, art, religion, science and technology, and human relationships. Throughout stress is placed on the development of critical and analytic abilities, and bringing philosophic modes of thought to bear on issues of concern in a complex and 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 Professions, Feminism, Parents and Children, Science and Technology, Communication, 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,* and (b) those who received their baccalaureate degree some years ago and who are desirous of returning to school to broaden or continue their education in this area. Graduate students in other departments at Stony Brook may also find some of the courses of interest. 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.

* *MA/LS refers to the Master of Arts in Liberal Studies Program offered by the Center for Continuing Education.*

Admission

Admission to Graduate Studies in Philosophical Perspectives (Master's Level, MA/PP)

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 (GRE) 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 enroll 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. GRE 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 re-

quired to take a total of 10 courses amounting to 30 graduate credit hours, as listed below:

1. Two three-credit courses (PHI 510-511), Resources in the History of Philosophy
2. Two three-credit courses (PHI 515-516), Resources in Contemporary Philosophy
3. One three-credit course (PHI 518-519) in the detailed examination of the work of a single philosopher
4. Five three-credit courses in the MA/PP offerings.

These distribution requirements may be applied with some flexibility to meet the needs of individual students, with the approval of the director of the program.

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 12 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 on 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 Graduate Studies Director 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 previously 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 by (a) a paper (10-15 pages) outlining projected study, expected findings, relevant arguments and evidence (e.g. bibliography), and (b) 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.

D. 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 dissertation committee. After the dissertation is completed, it is read by a committee of four members, consisting of the director, two other members of the philosophy faculty, and one faculty member from outside the department who has specialized in related areas. Before final approval can be granted, the student must present the results of the dissertation research at an oral examination convened for that purpose by the department and open to interested faculty members and graduate students. If the dissertation defense is successful, the candidate is recommended to the University for the Doctor of Philosophy degree.

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: Contemporary European philosophy.

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 University: Systematic philosophy.

Casey, Edward S., Professor. Ph.D., 1967, Northwestern University: Aesthetics; phenomenology; philosophy of psychology.

de Nicolas, 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 Doctoral Program Director. Ph.D., 1954, Columbia University: Political philosophy.

Grim, Patrick, Associate Professor. B. Phil, 1975, St. Andrews; Ph.D., 1976, Boston University: Ethics; logic; contemporary analytic philosophy.

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; hermeneutics.

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 Frankfort, Federal Republic of Germany; 1971, University of Michigan: Art criticism; 20th-century art; northern Renaissance art.

Manchester, Peter, Associate Professor. Ph.D., 1972, Graduate Theological Union: Greek philosophy; Heidegger.

Martin, Christopher, Lecturer. M.A., 1976, Sussex (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: Philosophy of language; theory of knowledge; philosophy of psychology.

Rawlinson, Mary C., Associate Professor. Ph.D., 1978, Northwestern University: 19th-century philosophy; Hegel; aesthetics and literary theory; philosophical psychology; philosophy of medicine.

Silverman, Hugh J., Professor.[4] Ph.D., 1973, Stanford University: Continental philosophy; history of ideas; literary theory.

Simon, Michael A., Professor. Ph.D., 1967, Harvard University: Social philosophy; philosophy of biological and social science; philosophy of mind; philosophy of law.

Spector, Marshall, Professor and Master's Program Director. Ph.D., 1963, The Johns Hopkins University: Philosophy of science; philosophy of technology.

Sternfeld, Robert, Professor. Ph.D., 1948, University of Chicago: Logical theory; epistemology.

Tejera, Victorino, Professor. Ph.D., 1956, Columbia University: Aesthetics; classical philosophy.

Watson, Walter, Associate Professor. Ph.D., 1958, University of Chicago: History of philosophy.

Welton, Donn, Associate Professor and Chairperson. Ph.D., 1973, Southern Illinois University: Phenomenology and epistemology.

Weston, Anthony, Assistant Professor. Ph.D., 1982, University of Michigan, Ann Arbor: Ethics and value theory; environmental ethics; social philosophy.

Williams, Peter, Assistant Professor. [3,5] Ph.D., 1973, Harvard University: Philosophy of law; ethics.

Zyskind, Harold, Professor.[7] Ph.D., 1964, University of Chicago: Philosophic rhetoric; history of philosophy.

Number of teaching, graduate and research assistants, fall 1985: 38

[1] *Joint appointment, Department of Art*
[2] *Dean of Humanities and 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*
[7] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1983-84*

Courses

Detailed course descriptions for both the Master's and Doctoral Programs are available from the Philosophy Department office each semester.

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 Pespectives on Death and Dying

IV. Perspectives on Inquiry, Method and the Sciences

PHI 561 Structure of Inquiry

PHI 562 Logic

PHI 563 Philosophy 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

Ordinarily, students working on their master's Essay will register for this course.

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)632-7300

The Department of Theatre Arts offers two graduate programs: a three-year (72 credit) Master of Fine Arts (M.F.A.) in Dramaturgy and, parallel with the first year of the M.F.A., a one-year (30 credit) Master of Arts 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. Distinguished specialists from the University's Foreign Language, English and Comparative Literature Departments contribute to the training. 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.

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. 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 semesters 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.

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 University library is immediately 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 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 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 (GRE) 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. 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 Graduate Studies Director before the end of his or her first semester in the program (see Transfer Credit policy).

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. 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. GRE 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 degree 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 Graduate Studies Director before the end of the student's first semester in the program (see Transfer Credit policy).

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 first 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 three 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)
- THR 506 Master's Thesis (see *E* below)
- Two electives

B. Final General Examination

A final general examination 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 by passing with a grade of B or better a language proficiency examination given by the department.

D. 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, three credits).

E. The Master's Thesis

The master's thesis (THR 506, three 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 Graduate Studies Director 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 are required:

A. Course Requirements.

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)
   - THR 506 Independent Project
   - One elective

   General Examination—At the end of the first year, a general examination assaying the student's knowledge of theatrical history, theory, and criticism must be passed with a grade of B or better.
2. Second year:
   - THR 600 Theatre History II
   - THR 601 Directing
   - THR 602 Translations and Adaptations
   - THR 603 Theatre Architecture and Stage Design
   - THR 604 Concept and Execution
   - THR 605 Independent Projects: Scripting
   - Two electives
3. Third year:
   - THR 650 The Profession of the Dramatist
   - THR 651 Shakespeare's Theatre
   - THR 652 Theatre and the Media
   - THR 653 Dramaturg's Practicum
   - THR 654 Professional Internship (six credits)
   - THR 655 Third year M.F.A. Projects

   Comprehensive Examination—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.

B. 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 by passing with a grade of B or better a language proficiency examination given by the department.

C. 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, three credits).

D. 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 States or abroad.

E. Time Limitation

The M.F.A. program is normally completed in three years. The time limit for completion of the M.F.A. program, given unusual circumstances, is six 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.

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.

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, England: Television production and programming.

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.

Rowe, Carel, Assistant Professor. Ph.D., 1978, Northwestern University: Media theory and production.

Rosen, Carol, Associate Professor. Ph.D., 1975, Columbia University: Dramatic theory and criticism; dramaturgy; comparative modern drama.

Faculty members from other participating departments include:

Allentuch, Harriet R., Professor.[3] Ph.D., 1962, Columbia University: 17th-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, Professor.[2] Ph.D., 1960, Yale University: Restoration 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.

Number of teaching, graduate and research assistants, fall 1985: 6

[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.
Prerequisite: Admission to the M.A. or first year of the M.F.A. program or permission of the Graduate Studies Director
Fall, 3 credits

THR 501 Studies in 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.
Prerequisite: Admission to the M.A. program or first year of the M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the M.A program or first year of the M.F.A. program or permission of the Graduate Studies Director
Fall, 3 credits

THR 503 Studies in 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.
Prerequisite: Admission to the M.A. program or first year of the M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the M.A. program or first year of the M.F.A. program or permission of the Graduate Studies Director
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 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.
Prerequisite: Admission to the M.A. program or first year of the M.F.A. program or permission of the Graduate Studies Director
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 some aspect of a particular theatre company or an artistic movement.
Prerequisites: The successful completion with a grade of B or better of at least 12 credits of Theatre Arts Department 500-level courses and approval of the Graduate Studies Director
Fall, spring, or summer, 1-3 credits, may be repeated

THR 508 Design/Tech: Theory and Practice
Study in the development and execution of the visual presentation of professional theatre. The student's time is divided between an in-depth analysis of the design and technical process in a seminar setting, and the experience of working with theatre professionals developing practical skills.
Prerequisites: Permission of instructor and Graduate Studies Director
Summer, spring, 3 credits

THR 520 Dramaturgy: Script Preparation
A practical and theoretical approach to the contributions of the dramaturg. This course includes both a seminar and a practicum where work on actual on-campus productions will take place.
Prerequisite: Admission to the M.A. or M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the M.A. or M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the M.A. or M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: 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.
Prerequisite: Admission to the M.A. or M.F.A. program or permission of the Graduate Studies Director
Fall or spring, 3 credits

THR 552 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.
Prerequisite: Admission to the graduate programs or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the M.A. or M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the M.A. or M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the M.A. or M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the M.A. or M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the M.A. or M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the M.A. or M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the M.A. or M.F.A. program or permission of the Graduate Studies Director
Fall, spring, or summer, 3 credits

THR 560 Practicum in 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.
Prerequisite: Admission to the M.A. or M.F.A. program or permission of the Graduate Studies Director
Fall, spring, or summer, 3 credits

THR 599 Independent Study
Under the direction of a faculty advisor, the student pursues an area of special interest, either with directed readings or independent study, subject to the approval of the Graduate Committee.
Fall and spring, variable and repetitive credit

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.
Prerequisite: Admission to the second year of the M.F.A. program or permission of the Graduate Studies Director
Fall, 3 credits

THR 601 Directing
An approach to methods and techniques of directing. Seminar will include collaboration between directors and actors in realizing a script.
Prerequisite: Admission to the second year of the M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the second year of the M.F.A program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the second year of the M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the second year of the M.F.A. program or permission of the Graduate Studies Director
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 Graduate Studies Director 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.
Prerequisite: Admission to the second year of the M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the second year of the M.F.A. program or permission of the Graduate Studies Director
Spring, 3 credits

THR 650 The Profession of the Dramatist
The work of playwrights from different periods will be examined in terms of critical theory, structure, and theatrical practice. For example, the

works of Aeschylus, Moliere and Shaw would be compared from a theatrical perspective.
Prerequisite: Admission to the third year of the M.F.A. program or permission of the Graduate Studies Director
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.
Prerequisite: Admission to the third year of the M.F.A. program or permission of the Graduate Studies Director
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 Graduate Studies Director
Fall, 3 credits

THR 653 Dramaturg's Practicum
Advanced students in the program will function as dramaturgs for campus productions. Their functions will include work with the director, research, programs, questions of casting, post-performance discussions and possibly translation or adaptation of texts.
Prerequisite: Successful completion of the first two years of M.F.A. coursework, or permission of the Graduate Studies Director
Fall, spring, 3 credits

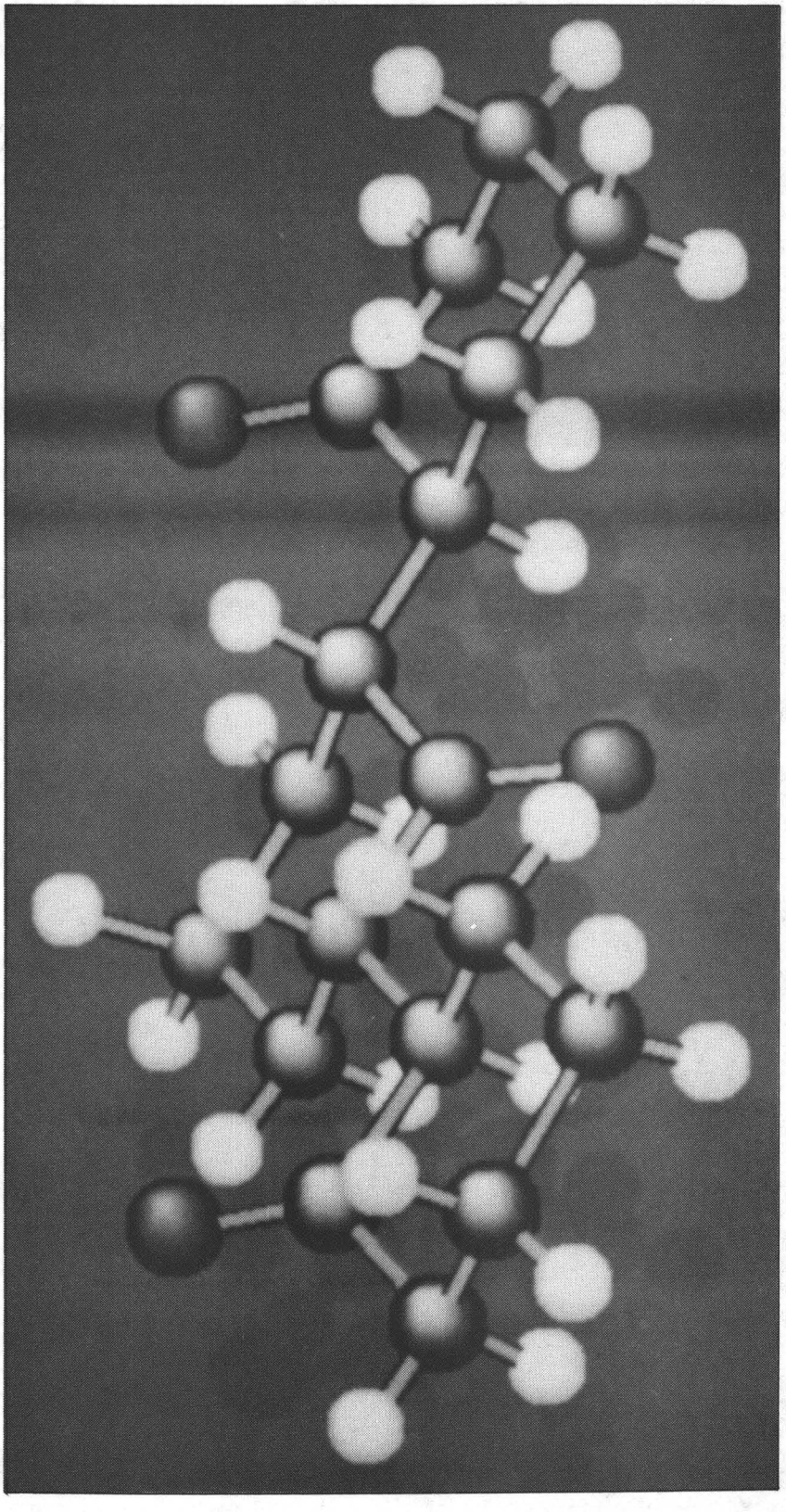
THR 654 Professional Internship
The M.F.A. third-year internship is normally either (1) as a dramaturg with a professional theatre in the U.S. or abroad, or (2) as a critic with a performing arts publication. The internship includes a critical journal that records, analyzes, and evaluates the work on 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 Graduate Studies Director
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 Studies Director and Graduate Committee.
Prerequisite: Successful completion of all coursework for the M.F.A. or permission of the Graduate Studies Director
Spring, summer, 6 credits

Division of Physical Sciences and Mathematics

Dean Ronald Douglas
Library 2340
(516)246-5917

The Departments of Chemistry, Earth and Space Sciences, Physics and Mathematics constitute 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 is a multitude of seminars and talks by distinguished visitors. Detailed information about special research programs and facilities is described in the following sections.



Chemistry
(CHE)

Chairperson: J.L. Whitten
Chemistry Building 104 632-7886

Graduate Studies Director: F. W. Fowler
Chemistry Building 104

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 (GRE) 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 30 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, French 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) examination. This examination, normally completed within one year following qualification to the Ph.D. degree, consists of a written proposition and oral defense, a discussion of the student's research and a discussion of literature material.

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 in-

terests 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 sudent 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, 504, 511, 514 and 515

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.

Barbara, Thomas M., NMR Coordinator. Ph.D., 1981, Columbia University: Solid state NMR studies of liquid crystalline systems; ^{2}H-quadrupolar NMR spectra; determination of order parameter from quadrupole splitting.

Bates, H.A., Assistant Professor. Ph.D., 1977, University of California, Berkeley: Synthesis and structure determination of biologically significant natural products.

Bednar, Rodney A., Assistant Professor.[1] Ph.D., 1981, University of Delaware: Mechanism of enzyme action; affinity labelling and suicide enzyme inactivators as probes of structure and function of enzymes; rationale design of drugs.

Bell, Thomas W., Assistant Professor. Ph.D., 1980, University College of London: Development of synthetic methods and reagents; ion-selective macrocyclic multidentate ligands, including crown ethers; synthesis of polycyclic aromatic heterocycle; bioactive natural products, including insect pheromones.

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 and Dean for International Programs. 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. Ph.D., 1959, Cornell University: Laser scattering, small-angle X-ray scatterings, critical phenomena, molecular forces; configuration and dynamics of macromolecules; structure of non-crystalline media; liquid crystals.

Fowler, Frank W., Profesor and Graduate Studies 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 and Associate Vice Provost for Curriculum.[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.

Harbison, Gerard S., Assistant Professor. Ph.D., 1984, Harvard University: Solid state NMR studies of biological systems; ^{1}H/^{13}C NMR studies of condensed phases of bacteriorhodopsia, mitochondrial HATPase.

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.[6] 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, Associate 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., Adjunct 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.

Millar, Michelle M., Research Assistant Professor. Ph.D., 1975, Massachusetts Institute of Technology: Reactivity, electronic and structural properties of transition metal complexes, organometallic chemistry, bioinorganic chemistry.

Newton, Marshall D., Adjunct Professor. Ph.D., 1966, Harvard University: Theoretical chemistry ab initio electronic structure calculations; prediction and analysis of molecular structure and energetics; elucidation of charge transfer mechanisms in polar media.

Ojima, Iwao, 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., 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, Adjunct 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.

Rokita, Steven E., Assistant Professor. Ph.D., 1983, Massachusetts Institute of Technology: Bioorganic and enzyme chemistry; DNA photochemistry.

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., 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.

Thomann, Hans, Adjunct Assistant Professor. Ph.D., 1982, State University of New York at Stony Brook: Magnetic resonance in disordered heterogeneous and amorphous condensed matter; development and application of EPR techniques to conducting polymers, active sites in biological systems, and heterogeneous catalysis; microscopic NMR imaging techniques.

Weiser, David, Adjunct Associate Professor. Ph.D., 1956, University of Chicago: NPSO bonding theory; history of science, especially Newton, Dalton.

Whitten, Jerry L., Professor and Chairperson. 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 1985: 112.

[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.*
[6] *Recipient of the State University President's and Chancellor's Award for Excellence in Teaching, 1985-86.*

Courses

CHE 501 Spectroscopy in Organic Chemistry
Modern spectroscopic techniques (^{1}H and ^{13}C-NMR, IR, MS, UV and CD-ORD) applied to organic compounds. Structural effects on spectroscopic properties are surveyed with dual emphasis on fundamental aspects and problem-solving. The student learns how to use spectroscopic methods both to solve complex structural problems and to investigate bonding features in organic molecules.
Spring, 3 credits

CHE 502 Mechanistic Organic Chemistry
Important reaction mechanisms and the methods by which they are studied. Substituent and medium effects on reactions proceeding through concerted mechanisms and unstable intermediates are discussed.
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 504 Structure and Reactivity in Organic Chemistry
Electronic and stereochemical theories relating to organic structure and reactions. Topics such as bonding, strain, aromaticity, MO theory, molecular rearrangements, pericyclic reactions and photochemistry will be covered. This course is intended to provide a foundation of knowledge at the beginning graduate level as preparation for advanced subjects in CHE 502 and CHE 503, and is complementary to CHE 501.
Fall, 3 credits

CHE 511 Structural Inorganic Chemistry
Properties and reactions of inorganic compounds are considered from the viewpoint of molecular and electronic structure. The modern bonding theories used in inorganic chemistry including molecular orbital, valence bond and ligand field theories are developed using symmetry and group theory. Selected main group, transition metal and organometallic compounds are discussed. An introduction to crystallography and solid-state structure will be included.
Fall, 3 credits

CHE 514 Transition Metal Chemistry
A survey course with an emphasis on the transition metals. Reaction mechanisms, synthesis, and structure will be covered. Specific areas of concern will include coordination chemistry, organometallic chemistry, bioinorganic chemistry and selected topics from solid state and non-transition metal chemistry.
Spring, 3 credits

CHE 515 Advanced Inorganic Chemistry
A topical course with an emphasis on the current literature. Subject matter will vary and will be announced in advance. Possible subjects include reaction mechanisms, organometallic chemistry, bioinorganic chemistry, and physical inorganic chemistry. May be repeated as the subject matter varies.
Spring, 3 credits

CHE 521 Quantum Chemistry I
Quantum theoretical concepts are discussed. Schrodinger wave mechanics and related mathematical techniques are illustrated by treatment of systems of chemical interest. Designed to form the theoretical basis for the study of chemical bonding, molecular structure, spectroscopy and molecular collision phenomena.
Fall, 3 credits

CHE 522 Quantum Chemistry II
Problems in time-dependent quantum mechanics with the derivation of both approximate and exact solutions. The elements of group theory with applications to atomic, molecular and solid-state systems.
Spring, 3 credits

CHE 523 Chemical Thermodynamics
A rigorous development of the fundamentals of thermodynamics and its application to a number of systems of interest to chemists. These systems include electrochemical cells, gases, homogeneous and heterogeneous equilibrium systems. An introduction to statistical mechanics will also be included.
Fall, 3 credits

CHE 526 Chemical Kinetics
An intensive study of rates of chemical reactions and in particular the relationship of kinetic studies to the determination of reaction mechanisms. Experimental methods will be discussed with emphasis on the determination of rate laws. The theoretical treatment will include discussions of the kinetic theory and the transition-state theory approaches to chemical kinetics.
3 credits

CHE 528 Statistical Mechanics
Statistical theory of equilibrium systems and rate processes. Ensemble theory, spatial and time correlation functions. Model systems and methods of estimating their properties. Designed to enable the student to use the current literature dealing with application of statistical mechanics to problems in chemistry.
3 credits

CHE 529 Nuclear Chemistry
Topics include the properties of radioactive substances and their use in the study of chemical problems; nuclear structure; nuclear reactions; radioactive decay and growth; interactions of radiation with matter; detection and measurement of radiation; application of radioactivity to chemical problems such as kinetics, structure and analysis; artificially produced elements.
3 credits

CHE 530 Physical Chemistry of Macromolecules
An investigation of the gross and fine structures of macromolecules and molecular aggregates in solution as revealed by hydrodynamic behavior (e.g., ultracentrifugation, viscosity), light scatter-

ing, spectroscopic properties (e.g., ultraviolet hypochromism, circular dichromism, Raman, fluorescence, magnetic resonance spectra), and the thermodynamics and kinetics of interaction with small molecules and ions. Theory of conformation changes and phases transitions.
3 credits

CHE 531 Departmental Research Seminar
Meetings in 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 542 Physical Methods in Chemistry
Subject matter and prerequisites will vary and will be announced in advance. Possible subjects include nuclear magnetic resonance (NMR), molecular spectroscopy, and X-ray crystallography. May be repeated as the subject matter varies.
Fall or spring, 3 credits

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: 0 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 Physical 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 698 Colloquium
Variable credit

CHE 699 Research
Variable and repetitive credit

Earth and Space Sciences (AST, GEO)

Chairperson: Gilbert N. Hanson
Earth and Space Sciences Building 255 (516)632-8200

Graduate Studies Director: William J. Meyers
Earth and Space Sciences Building 234 (516)632-8202

The Department of Earth and Space Sciences offers courses of study leading to M.S. and Ph.D. degrees, with Graduate Studies in both Astronomy (AST) and Geological Sciences (GEO). Included under Astronomy are concentrations in astronomy, astrophysics and planetary sciences; included under Geological Sciences are geochemistry, geophysics-tectonics, sedimentary geology, and paleontology.

The department occupies a modern, well-equipped building that houses the department library, laboratories for rock processing, a machine shop with four full-time machinists, a carpentry shop and an electronics shop with two full-time technicians. The adjacent High Pressure Laboratory, 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 Astronomy

Within Graduate Studies in Astronomy, 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 Astronomy 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. Financial support is available for graduate students in good standing.

Facilities for Astronomy

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 four broad areas: geochemistry, geophysics-tectonics, sedimentary geochemistry, and paleontology.

Concentration in Geochemistry

Students may concentrate on one of the basic geochemical disciplines, such as minerology, crystallography, experimental and theoretical phase equilibria, igneous or metamorphic petrology, trace element or isotope geochemistry, or students may combine these to attack such multidisciplinary problems as the origin of the moon and planets, the nature and chemical history of the Earth's mantle or crust.

Currently the focus of research in

geochemistry centers around the physical conditions attending the chemical evolution of the crust and upper mantle of the Earth. Scientific advances in these areas require study on widely divergent scales, from the submicroscopic details of crystal structure and chemistry to the accretion of oceanic and continental blocks onto stable continental cratons. Such research efforts comprise a wide range of field, laboratory and theoretical approaches, many aspects of which interface with geophysics, tectonophysics and sedimentary geochemistry.

Our approach to problems in geochemistry typically comprises a strong component of field studies that form the basis for experimental, observational and theoretical geochemistry, petrology and mineralogy/crystallography. Much of the geochemical work is carried out in state-of-the-art laboratories housed in the Earth and Space Sciences Department. These facilities include a new, fully automated Cameca Electron Microprobe, a JEOL 200 CX Scanning Transmission Electron Microscope, two automated thermal emission mass spectrometers, a rare gas mass spectrometer, laboratory facilities for experiments at elevated pressure and temperature including gas mixing furnaces, cold seal, internally-heated gas pressure and piston-cylinder apparatus, a direct current plasma spectrophotometer, a Mossbauer spectrometer and crystallography laboratory facilities including automated single crystal and powder diffractometers and diamond-cell facilities.

Igneous, Metamorphic and Isotopic Geochemistry

Studies of the crust and mantle include research on the origin of anorthosite and related rocks, the evolution of granulites, derivation of anatectic melts and the depletion of the lower crust in volatiles and radiogenic elements and associated petrologic processes that mature the upper mantle and crust and cause the formation of stable cratons. In addition, there are ongoing studies of the evolution of Archean crust using major, minor, trace element and radiogenic isotopes in order to evaluate protoliths of ancient granitoid gneisses in the context of early geochemical evolution of the crust and upper mantle. Field and laboratory studies of the structure, petrology and geochronology of the lithologic assemblages formed at Phanerozoic active plate margins complements studies of early crustal growth and maturation. Petrologic and geochemical studies also include investigations of the earliest chemistry and petrology of the Solar System through studies of meteorites. These comprise investigations of the chemical evolution of meteorites and their collisional and metamorphic histories.

Experimental Geochemistry

Experimental petrology plays a prominent role in the research endeavors of the department. Research projects emphasize the importance of attacking fundamental problems in petrology with well conceived, reversed experiments. Ongoing projects include studies on the phase equilibria of olivines, pyroxenes, oxides, garnets, amphiboles and biotites as well as calibration of new mineralogic thermometers and barometers.

Mineralogy and Crystallography

The understanding of many of the problems in geochemistry and geophysics depends on knowing how the structure of minerals respond to changes in temperature, pressure and chemical environment. These problems can be approached by considering the systematics of mineral chemistry, i.e., how the structures of minerals behave as the above parameters are varied. Research in crystallography is directed toward the application of crystal-chemical systematics to relating properties such as elasticity, thermal expansivity and electrical conductivity to crystal structure. Recently new projects have been initiated involving the dynamic aspects of thermal expansion, linking the results obtained from studies of thermal vibration in X-ray diffraction with those in spectroscopic experiments and analyzing the importance of anharmonic contributions to thermal properties of minerals.

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-pressure 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 Mechanics

The rock mechanics 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 three 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 crustal structure along the San Andreas fault.

Concentration in Sedimentary Geochemistry

The concentration in sedimentary geochemistry has as a primary focus the study of carbonate rocks and their diagenesis. This involves integrated research efforts including work in regional geochemistry, crystal chemistry, fluid inclusion analysis, and paleohydrology. Additional areas of research involve clastic sediment chemistry and crustal evolution, organic geochemistry and sedimentary basin evolution, carbonate facies analysis and paleoecology. The combined use of field and laboratory studies, quantitative modeling and new analytical techniques is a major emphasis of the program. Interaction with the crystal chemistry, experimental petrology, and isotope geochemistry groups, as well as with other outside groups, is encouraged. Field-based research is currently being conducted in areas as diverse as western Australia, western Canada, Ireland, the Alps, and locations throughout the United States.

Carbonate Petrology/Trace Element and Isotope Studies

Studies of carbonate diagenesis involve detailed identification of diagenetic features and development of diagenetic histories through use of conventional, cathodoluminescent and ultraviolet petrography. This allows establishment of geographic and stratigraphic distribution of major compositional zones, and also allows constraints to be placed on the timing of their precipitation so as to be of use as a framework for elemental and isotopic analyses. All of

these techniques are directed at establishing regional models for diagenesis.

Investigation of trace elements and isotopes in calcite cements, dolomites, and associated components are done in order to constrain the chemistry, sources and hydrodynamics of diagenetic fluids. In addition to conventional trace elements and stable isotopes of C and O, students are pioneering the use of rare earth elements, and the radiogenic isotopes of Pb, Sr and Nd. This work suggests that the combination of these chemical parameters will constitute a powerful tool for identifying possible sources of diagenetic fluids and modeling their evolution.

Mineralogy and Crystal Chemistry of Carbonates

Research in this area provides one of the fundamental means for understanding the differences in behavior of natural carbonate minerals by examining their crystal structures and specifically the imperfections in their structures.

One emphasis utilizes the high-resolution imaging and electron diffraction capabilities of the TEM to characterize crystal defects that form during growth and recrystallization of carbonates. These microstructures provide information concerning the actual mechanisms involved in these processes, and are currently being studied in natural dolomites, calcite cements, nomorphic calcites and in controlled laboratory-grown calcites. These studies are focused on understanding complex zoning, crystal morphalogy, crystal defects, trace and minor element distributions, and origin and deformation of fluid inclusions. In addition, single crystal and powder x-ray diffraction methods are utilized to study structural refinements, and effects of temperature, pressure and composition on crystal structure.

Burial Diagenesis and Evolution of Sedimentary Basins

Burial diagenesis of rocks and fluids is being studied in several intracratonic basins by combining organic maturity data, burial history analyses, and fluid inclusion data. Reconstruction of the burial history of the rocks in question allows estimates of absolute ages and durations of those diagenetic events whose pressure-temperature dependence is known and when integrated with petrographic and geochemical data yields a complete diagenetic history. These studies are important in understanding late stage diagenesis, and in testing models that invoke basin-sourced brines for diagenesis and ore deposition.

Fluid Inclusion Studies

Research in this area is currently focused on the mechanisms by which the cavities and fluids of fluid inclusions in carbonate minerals are altered after their initial formation. TEM studies of synthetic fluid inclusion stretching and experimental studies of fluid inclusion leakage under various geothermal gradients are in progress. In addition, studies of phase relations in extremely saline fluid inclusions, and regional studies of fluids in late diagenetic minerals are underway.

Facilities

The Department of Earth and Space Sciences has excellent facilities for research in sedimentary geochemistry, including a new Cameca electron microprobe, a 200 kV JEOL TEM, several mass spectrometers for trace element and isotope analyses, (argon) plasma spectrometer for element analysis, automated powder and single crystal diffractometers, an ISI SEM, Nuclide Luminoscope, and heating-cooling stages for fluid inclusion studies.

Concentration in Paleontology

Paleontological research at Stony Brook is focused principally on the study of evolutionary rates, morphometrics and quantitative biostratigraphy. An interdepartmental Committee on Paleobiology is composed of faculty from four departments whose teaching and research interests are concentrated primarily on phylogenetics, human evolution, evolution of mammals and invertebrate paleoecology. Paleontological research presently being carried out in the Department of Earth and Space Sciences involves the correlation of Late Ordovician strata in eastern North America as well as the alpha-level taxonomy of Middle Ordovician lophospirid gastropods.

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 (GRE) 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 (AST)

Requirements for the M.S. Degree — Astronomy

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 24 graduate credits with no more than six credits of Practicum in Teaching, and no more than three credits of Research. In addition, the student must successfully complete AST 553, AST 583, AST 584 and at least three credits from AST 554, AST 585, or AST 611.

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. 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.

E. Residence

There is no residence requirement.

F. 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 — Astronomy

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.

C. Preliminary Examination

Successful defense of a thesis proposal is required. The student, in conjunction with a faculty advisor, prepares a written thesis proposal and submits it to a committee of the faculty two weeks in advance of the preliminary examination. The committee will

review the written proposal for its suitability as a thesis topic within a week. The preliminary examination consists of an oral presentation of the proposal and an oral examination on the proposal and related topics.

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 Preliminary 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 Ph.D. degree, except the dissertation.

Degree Requirements (GEO)

Requirements for the M.S. Degree — Geological Sciences

A. Residence
There is no residence requirement.

B. Language
There is no language requirement.

C. Formal Coursework
Successful completion with a B average of an approved course of study consisting of 30 graduate credits with a minimum of 18 academic credits and a thesis. Courses which satisfy the academic credit requirements must be in the approved course of study, must be at the graduate level, and cannot be teaching or research courses. Part of this course requirement comprises at least one semester of independent research which results in a research paper to be evaluated by a three-member faculty committee (two advisors plus one) at the end of the semester and before the graduate student evaluation.

D. M.S. Thesis Proposal
An M.S. thesis proposal of two to three pages in length is to be submitted to the Graduate Committee and the Advising Committee before the last day of finals at the end of the first year. This proposal will be evaluated by the three-member faculty committee (two advisors plus one) before the graduate student evaluation, but need not bear faculty signature. Final acceptance of the M.S. thesis proposal will be by faculty signature(s) after the end-of-semester graduate student evaluation.

E. Evaluation of Thesis
The thesis must be approved by an examining committee and defended in an oral defense, part of which includes a public presentation of the results of the M.S. thesis research.

The faculty advisor must certify satisfactory completion of the research before the Graduate Committee will establish an examining committee. Copies of the thesis shall be submitted to the M.S. Examining Committee at least one week before a planned M.S. examination. The committee must respond to the student within one week after receipt of the thesis. Only if the committee attests that the thesis is well written, that it shows competent collection and interpretation 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.

A final oral thesis defense, required of all M.S. candidates shall be given after completion of the thesis. The Examining Committee shall consist of at least three experts in the field who hold Ph.D.s. These generally will be faculty members, but may include research associates or visiting experts. The defense may cover any topic on the student's approved course of study, but generally focuses on the thesis.

The thesis defense must be administered at least two weeks before the end of classes in the semester during which the degree is to be conferred, and the final thesis must be submitted to the Graduate School no later six months after the thesis defense.

F. M.S. Degree Without a Thesis
Under unusual circumstances and in consultation with faculty advisors, the M.S. degree may be awarded after 30 graduate academic credits without a thesis.

G. 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.

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 — Geological Sciences

A. General Statement
The Ph.D. preliminary examination is the primary examination before embarking on a Ph.D. thesis. Its main purpose is to identify the research potential of the student and to assess whether this potential is sufficient to obtain a Ph.D. degree. The preliminary examination is a major examination, but it is only part of the evaluative process which recognizes all of the student's accomplishments from the time that he or she arrives at Stony Brook.

The following elements are important for a Ph.D.:

1. Creativity, originality, and independence in development of research projects and in problem solving
2. Flexibility of thought processes
3. Knowledge of and critical evaluation of the forefront of the science
4. Ability to obtain the skills and specific knowledge to solve particular problems
5. Basic knowledge to support items 1-4
6. Ability to complete research projects and to present results in written papers and oral presentations to the scientific community.

One Ph.D. research proposal will be used to evaluate the student with regard to these criteria.

B. Residence
Two consecutive semesters of full-time graduate study are required.

C. Language
There is no language requirement.

D. Formal Coursework
Successful completion of an approved course of study is necessary. The number of credit hours required is unspecified and will be set according to the student's background and interests.

For a student entering the Ph.D. track without a M.S. degree, the approved course of study must include two research courses under two different faculty members. These independent research courses must result in research papers to be evaluated by a three-member evaluation committee at the end of the second semester and before the graduate student evaluation.

For a student matriculating at Stony Brook with a M.S. degree, the course of study must include at least one research course resulting in a research paper; the M.S. thesis serving as a second research paper. The research paper and M.S. thesis are to be evaluated at the end of the first semester by a three-member faculty evaluation committee before the graduate student evaluation.

Under unusual circumstances, papers resulting from independent research done during the summer or outside the department may substitute for the above required research papers, with appropriate evaluation by the three-member committee.

E. Preliminary Examination Procedures

Successful defense of one research proposal is required. Geological Sciences graduate students may decide on their own initiative to take the Ph.D. preliminary examination. Such decision will generally be an outgrowth of consultations with advisors, which in turn will monitor the student's research progress. Typically, the Ph.D. preliminary examination process will begin late in the first year for students entering with a M.S., late in the second year for students entering with a B.S./B.A. and who are bypassing a M.S., and late in the third year for students receiving a M.S. at Stony Brook.

Abstract: The student will submit an abstract of a research proposal to the Graduate Committee for approval. A single abstract must be endorsed, in writing, by three Geological Sciences faculty members. Endorsement signifies that the preparation by the student of a written proposal based on the stated topic is acceptable. One or more of the signatories must be identified as a potential sponsor(s), a designation that signifies a willingness, but not a binding commitment, to supervise the proposed research. This procedure does not commit a student to work with the indicated sponsor(s), but provides the student with an early indication that a potential thesis advisor is available for the proposed research topic.

Preliminary Examination Committee: Upon approval of the abstract, the department Chairperson, in consultation with the Graduate Committee, will nominate the Preliminary Examination Committee and a chairperson 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.

Research Proposal: Following the approval of the abstract, the student will be instructed to prepare the proposal in depth — a process which normally takes about six weeks. The 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 proposal will be submitted to the members of the Examination Committee, Graduate Committee, and other interested faculty members. The Examination Committee will judge the proposal for soundness of idea, suitability as a Ph.D. topic, and quality of development. Within one week after receiving the proposal, the Examination Committee must either (a) approve the proposal and set the time and place for a preliminary examination to be held within one week; (b) inform the student that the proposal is unacceptable as written and request that it be resubmitted within a given time, not greater than four weeks; or (c) reject the proposal, in which case there is no preliminary examination and the student is terminated. If the proposal is accepted, the student will circulate and post a notice of the time and place of the examination and the title of the proposal as soon as possible after acceptance of the proposal by the Examination Committee.

Preliminary Examination: The student will be given time at the examination to set forth briefly the research proposal, 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 proposal 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 proposal with regard to the quality of development and defense and the adequacy of the student's background knowledge. In summary, it will judge whether the student has demonstrated the ability to conceive, plan, and carry out original and significant research. A grade of "pass" from at least three members of the committee shall constitute a successful defense. A student may pass with qualifications which must subsequently be met for a successful defense. The chairperson of the Preliminary Examination Committee will inform the student of the committee's decision and submit a written report of the examination (signed by all committee members) to the Graduate Committee. If the student does not pass the examination, the Examination Committee will recommend further action to the Graduate Committee. This recommendation will be implemented by the Graduate Committee, in consultation with the faculty.

F. Advancement to Candidacy

Upon successful completion of the preliminary examination, including any associated qualifications, and meeting of the requirements of the department and of the course of study, the student will be considered for advancement to candidacy. This recommendation is made by the Graduate Committee, through the department Chairperson to the Vice Provost for Research and Graduate Studies. Candidacy signifies that the student has successfully completed all Graduate School and departmental requirements for the Ph.D. degree, except the dissertation.

G. Dissertation Research

If the subject of the dissertation research differs from that in the research proposal defended at the preliminary examination, a dissertation statement must be endorsed by two faculty members in addition to the thesis advisor and submitted to the Graduate Committee. Thereafter, a brief oral report on the dissertation research will be presented yearly to the department until the dissertation is completed, and a brief progress report will be presented to the student's advising committee each semester, as explained in the advising procedures.

H. Dissertation

The finished dissertation must be approved by a Dissertation Examining Committee which shall consist of five members of faculty rank, at least one of whom must be from 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 committee chairperson must not be the supervisor of the dissertation. The 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 defend. The committee will conduct the oral defense of the dissertation. The presentation will be open to all faculty members and to others by invitation of the student.

I. Time Limit

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., Associate Professor. Ph.D., 1979, University of Michigan: Petrogenesis of metamorphic and igneous rocks, heterogeneous phase equilibria, evolution and maturation of continental crust.

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.

Davis, Daniel M., Assistant Professor, Ph.D., 1983, Massachusetts Institute of Technology: Quantitative geophysical modeling of fold and thrust belts; geodynamic modeling of the state of stress in the lithosphere.

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: Mineral physics; 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.

Lissauer, Jack J., Assistant Professor. Ph.D., 1982, University of California, Berkeley: Formation of the Solar System; ring dynamics; cratering population on satellite surfaces.

McLennan, Scott M., Assistant Professor. Ph.D., 1981, The Australian National University: Geochemistry of sedimentary rocks, sedimentary petrology.

Meyers, William J., Professor and Graduate Studies Director. 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. 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., Associate 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.

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 1985: 55

[1] *Joint appointment, Marine Sciences Research Center*

Courses in Astronomy

AST 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 techiques appropriate for wavelengths shorter than one micron. Extensive laboratory and observing exercises may be expected.
Spring, alternate years, 4 credits

AST 553 Stellar Interiors and Evolution
The study of the structure and evolution of stars. Topics will include the formulation of the equations describing hydrostatic equilibrium and energy transport, the equations of state, nuclear energy generation, sources of opacity. Model calculations are compared with observation of individual stars and clusters of stars. The stages of evolution covered will include main sequence and pre-main sequence evolution. Post-main sequence evolution through white dwarfs and neutron stars will be described in detail.
Fall, alternate years, 3 credits

AST 554 Stellar Atmospheres
The study of the structure of stellar atmospheres and chemical abundance determinations. Topics will include radiative transfer, thermodynamics in the presence of a radiation field, spectral line formation, and temperature, gravity and composition determination. Departures from hydrostatic equilibrium and plane-parallel symmetry will be discussed including such topics as mass loss in spherically symmetric systems and radiation transport in the presence of magnetic fields.
Spring, alternate years, 3 credits

AST 583 Interstellar Medium
A study of the interstellar medium with emphasis on physical processes. Topics include kinetic theory, equation of transfer, spectral lines, non-thermal emission, ionization, effects of dust, formation and spectroscopy of molecular clouds. The components of the interstellar medium and the interactions between them will be discussed in detail, as well as the process of star formation.
Fall, alternate years, 3 credits

AST 584 Galaxies
A basic course on the observational and theoretical aspects of the content, dynamics and evolution of galaxies: potential theory; stellar orbits; equilibria and stability of collisionless stellar systems; spiral structure, bars and warps; collisions of stellar systems; galactic evolution; clusters of galaxies; dark matter. Approximately one-half of the course is spent on the Milky Way and the other half on other galaxies.
Fall, alternate years, 3 credits

AST 585 Cosmology and High Energy Astrophysics
A basic course on cosmology and primarily extragalactic high energy astrophysics: Hubble expansion; Friedman universes; age of the universe; microwave background radiation; big-bang nucleosynthesis; inflation growth of gravitational instabilities; correlation functions; local density and velocity perturbations; dark matter; synchrotron radiation; inverse Compton scattering; pulsars; extragalactic radio sources; quasars and active galactic nuclei; black holes.
Fall, alternate years, 3 credits

AST 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.
Fall and spring, 1-3 credits

AST 599 Research
Fall and spring, variable and repetitive credit

AST 600 Practicum in Teaching
1-3 credits, repetitive

AST 601 Advanced Topics in Astronomy-Astrophysics
Fall and spring, 3 credits per semester, repetitive

AST 611 Planetary Atmospheres
A survey of current knowledge about the composition, structures, and dynamics of the atmospheres of planets in the solar system. Models for the 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 ESC 681.
Fall, alternate years, 3 credits

AST 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

AST 699 Dissertation Research
Independent research for Ph.D. degree. Open only to candidates for the Ph.D. who have passed the preliminary examination.
Fall and spring, variable and repetitive credit

Courses in Geological Sciences

GEO 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

GEO 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

GEO 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

GEO 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

GEO 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

GEO 514 Stratigraphy and Subsurface Fluids
Advanced course in cyclic sedimentation, synthetic stratigraphy, petroleum hydrogeology, sediment compaction and burial diagenesis. Control of subsidence rates and rock-water interaction will be emphasized.
Prerequisites: Previous coursework in stratigraphy and sedimentology
Fall, alternate years, 3 credits

GEO 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

GEO 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, alternate years, 4 credits

GEO 521 Isotope Geology
Consideration and evaluation of the various decay radiation schemes useful for determining the ages of rocks and minerals. Development of the theoretical background necessary for the application of trace elements and radiogenic isotopes to the study of geologic processes in igneous, metamorphic and sedimentary systems.
Fall, 3 credits

GEO 522 Planetary Sciences
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

GEO 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

GEO 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

GEO 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

GEO 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

GEO 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

GEO 537 Evolution of Sedimentary Basins
The causes of formation, sedimentary histories and post-depositional evolution of selected sedimentary basins will be discussed in lecture and seminar format. Differences between intracratonic, passive-margin and orogenic basins, and between basins and platforms will be illustrated by studying examples from the geologic record.
Prerequisite: GEO 303 or equivalent
Fall, 3 credits

GEO 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

GEO 544 Restricted Marine Environments: Ancient and Modern
An intensive and interdisciplinary study of restricted marine environments, including anoxic basins and evaporative basins, as they occur in the modern world and as they are represented in the geologic record. The chemical, sedimentologic and paleoecologic import of these unusual circulation systems will be examined. This course is identical to MAR 544.
Prerequisite: Previous coursework in stratigraphy
Spring, 3 credits

GEO 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. This course is identical to MAR 545.
Prerequisites: Introductory course in stratigraphy and sedimentation, geological oceanography, or permission of the instructor
Fall, 3 credits

GEO 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

GEO 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 GEO 552.
Fall, 3 credits

GEO 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 GEO 551.
Spring, 3 credits

GEO 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: GEO 551 and 552 or permission of instructor
Spring, 3 credits

GEO 562 Early Diagenesis of Marine Sediments
The course treats qualitative and quantitative aspects of the early diagenesis of sediments. Topics include diffusion and adsorption of dissolved species, organic matter decomposition and storage, and diagenesis of clay materials, sulfur compounds and calcium carbonates. The effects of bioturbation on sediment diagenesis are also discussed. This course is identical to MAR 562.
Prerequisite: Permission of instructor
Fall, alternate years, 3 credits

GEO 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

GEO 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: GEO 552 or permission of instructor
Spring, alternate years, 3 credits

GEO 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: GEO 551, 552 or permission of instructor
Fall, alternate years, 3 credits

GEO 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: GEO 552
Fall, alternate years, 3 credits

GEO 599 Research
Fall and spring, variable and repetitive credit

GEO 600 Practicum in Teaching
1-3 credits, repetitive

GEO 603 Topics in Petrology
1-3 credits

GEO 605 Topics in Sedimentary Geology-Paleontology
1-3 credits

GEO 609 Topics in Mineralogy and Crystallography
1-3 credits

GEO 699 Dissertation Research
Independent research for Ph.D. degree. Open only to candidates for the Ph.D. who have passed the preliminary examination.
Fall and spring, variable and repetitive credit

Mathematics
(MAT)

Chairperson: Irwin Kra
Mathematics Building 5-116 (516)632-8290

Graduate Studies Director: Detlef Gromoll
Mathematics Building 5-115 (516)632-8282

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 five-year B.S./M.A. program (Secondary Teacher Option). For details of the five-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 (GRE) 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 Emeritus. 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 Studies 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.

Katz, Mikhail, Assistant Professor. Ph.D., 1984, Columbia University: Differential geometry.

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, 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.

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 1985: 60.

[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 516 Probability and Statistics for Teachers
A priori and empirical probabilities, conditional probability; mean and standard deviation; random variables; financial distributions; continuous distributions; sampling; estimation; decision making.
Fall, spring or summer, 3 credits

MAT 518 Seminar on the Uses of Mathematics
This seminar will explore the ways in which secondary school and elementary college mathematics are 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
Lebesgue measure and integration. Radon-Nikodym theorem, Lebesgue-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 580 Combinatorial Analysis
Permutations, combinations; generating functions, linear recursions; matching theory, Ramsey's Theorem. Block designs, orthogonal Latin squares, finite geometries. Extremal problems, chromatic number, probabilistic methods.
Fall, 3 credits

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 credits 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, non-linear 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

MAT 650, 651 Topics in Combinatorics
Typical topics will be drawn from combinatorics and graph theory, Ramsey theory, extremal problems, and methods of enumeration.
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 three 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

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 Graduate Studies Director.
Variable and repetitive credit

Physics
(PHY)

Chairperson: Peter Paul
Physics Building P-110 (516)632-8110

Graduate Studies Director: Roderich Engelmann
Physics Building P-106 (516)632-8005

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 or physics teaching, Master of Science in scientific instrumentation, and 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 synchrotron at Brookhaven National Laboratory makes access to a first-class national facility unusually convenient. In addition, Stony Brook faculty members and students are currently conducting experiments at the Fermi National Accelerator Laboratory (Batavia, Illinois) and the Cornell Electron Storage Ring (Ithaca, New York). The experimental program is varied, with topics under consideration ranging from new particle searches, beauty quark investigations, and high-mass di-lepton and di-hadron studies, to measurements of neutrino-electron and neutrino-proton scattering cross-sections and neutrino oscillations. Techniques used comprise most of the available detector classes. The Stony Brook High Energy Physics Group is involved in the design and construction of the second major detector for the study of proton antiproton collisions at 2 TeV center of mass energy at the Fermi National Accelerator Laboratory. The Stony Brook group is also managing this large project.

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, kinetics of ordering transitions, 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 liquid He^3 and He^4 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 beam 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.

Experimental Atomic and Molecular Physics, Quantum Electronics

Several experiments use pulsed or continuous dye and diode lasers to prepare excited states. In one experiment, two lasers excite sodium to study coherences or the effects of an intense electric field. In another experiment He (3^3P) atoms are excited near the crossing of their fine structure levels to determine this fine structure to high precision (ppm). Experimental and theoretical studies of laser deceleration, cooling, and trapping of atomic beams are pursued. In other experiments "fast" beams and CO_2 lasers to prepare hydrogen and helium in individual Rydberg states are used. Measurements of stark shifts and ionization rates in either static or microwave fields, showing the onset of "chaos" are done. A primary goal of the experimental and theoretical program is to elucidate the role that the onset of chaos may play in a quantum system. The program at Brookhaven uses fast negative ion beams crossed with synchrotron radiation to study single and multiple photodetachment furnishing information on threshold laws and the atomic structure.

Atmospheric Physics

Novel techniques developed over the past several years by Stony Brook scientists from Physics and Radio Astronomy are 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), laboratory spectroscopy (Physics, Mechanical and Thermal Engineering) and theoretical studies of atmospheric dynamics (Mechanical and Thermal Engineering) which are leading to new information about anthropogenic influences on the earth's stratosphere and climate, and the evolution of planetary atmospheres.

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

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 supergravity and string theory, 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 and grand unified models of the fundamental interactions.

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.

Condensed Matter and Statistical Mechanics

The development in the last decade of a variety of new conceptual and computational tools has led to major changes in our understanding of condensed matter systems. Recent work at Stony Brook has focused on quantum mechanical effects on a macroscopic scale, on collective phenomena in low dimensional solids such as conducting polymers, on quantum Hall effect, and on properties of disordered systems. Computer simulation of solids and liquids (including problems involving interfaces, crystal growth, amorphous states, and electronic structure) is being done using both local dedicated super-mini computers and remote supercomputer facilities. In statistical mechanics there is very active research into one- and two-dimensional systems where exact mathematical calculations can be done. These include studies of phase transitions, solitons, and spin diffusion. The effort spans the range from quantum field theory to computer studies.

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 institution.

B. A minimum grade average of B in all undergraduate coursework, and of B in physics and mathematics.

C. Submission of results of the Graduate Record Examination (GRE) 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 Mechnics 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.S. 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 sophisticated 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. Acceptance of graduate student by an advisor for thesis work.

E. 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.

F. Research, dissertation and passing of the dissertation examination.

G. Teaching experience at least equivalent to that obtained in a one-year appointment as a teaching assistant.

H. One year of residence.

Faculty

Allen, Philip B., Professor. Ph.D., 1969, University of California, Berkeley: Theoretical solid-state physics.

Archie, Charles N., Research Associate 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, Associate Professor. Ph.D., 1976, Northwestern University: Theoretical solid-state physics.

Courant, Ernest D., Professor Emeritus.[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 and Graduate Studies Director. 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. 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.

Hansson, T. Hans, Assistant Professor. Ph.D., 1979, Goteborg University, Sweden: Nuclear theory.

Jackson, Andrew D., Professor. Ph.D., 1967, Princeton University: Nuclear theory.

Kahn, Peter B., Professor. 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.[4] Ph.D., 1963, University of California, Berkeley: Experimental high-energy physics; energy physics; X-ray optics.

Kivelson, Steven A., Associate 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, 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., 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. Ph.D., 1966, University of Michigan: Experimental high-energy physics.

Nieh, Hwa-Tung, Professor.[1] Ph.D., 1966, Harvard University: Theoretical physics; elementary particles.

Nishikawa, Koichiro, Research Assistant Professor. Ph.D., 1979, Northwestern University: Experimental high-energy physics.

Paul, Peter, Professor and Chairperson. 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.

Rijssenbeek, Michael, Assistant Professor. Ph.D., 1979, University of Amsterdam: Experimental high-energy physics.

Rocek, Martin, Associate 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.

Sprouse, Gene D., Professor. Ph.D., 1968, Stanford University: Experimental nuclear structure.

Stachel, Johanna, Assistant Professor. Ph.D., 1982, University of Mainz: Experimental nuclear structure.

Stephens, Peter W., Associate 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 1986: 150

[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: asymptotic analysis, perturbation theory, boundary layer techniques, chaotic systems, differential equations, special functions, boundary value problems, Green's functions, 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.
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. A number of historically important experiments are studied and performed with the aid of modern instrumentation. As they progress, students are encouraged to pursue independent projects in which there are no rigidly fixed formats or procedures. Primary emphasis is on the development of experimental skills and on professionally acceptable analysis and presentation of results, both in written and oral form. Projects are typically chosen from such fields as atomic and nuclear spectroscopy, particle physics, solid state and low-temperature physics, optics, and electromagnetism. Two three-hour laboratory sessions per week.
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
Topics will be selected from high-temperature properties: cluster expansions; 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, nuclear models.
3 credits

PHY 552 Nuclear Physics II
Topics include: nuclear forces, microscopic and phenomenological effective interactions; theoretical and experimental aspects of nuclear reactions; nuclear beta decay.
3 credits

PHY 555, 556 Solid-State Physics I, II
The first part of the course is primarily devoted to single particle properties of solids. Topics covered include symmetries of solids, energy band theory, transport properties and phonons. It also includes an elementary discussion of cooperative phenomena, such as magnetism and superconductivity. In the second semester the collective properties of strongly interacting condensed matter systems are addressed. Although the choice of topics may vary, they usually include the following: many body perturbation theory applied to condensed matter systems. Fermi liquid theory, an advanced discussion of electron-phonon interaction, superconductivity, disordered systems, critical phenomena, and renormalization group.
3 credits each semester

PHY 557 Elementary Particle Physics
Introduction to elementary particle physics. Symmetries and invariance in particle physics. Experiments in particle physics and experimental results. The properties of particles in terms of quarks and leptons and their interactions. An introduction to the Electro-Weak theory and models for strong interactions. Interactions at high energies. Interactions between particles and matter and its application in particle detectors. A case study of modern particle detectors.
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, lasers and laser 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 Astrophysics
A: introduction to some area of astrophysics. Topics to be selected from: stellar structure and evolution, stellar atmospheres, interstellar matter, planetary atmospheres, galactic dynamics, high energy astrophysics and cosmology, laboratory astronomical techniques.
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 612 Theoretical Particle Physics
Applications of quantum field theory to interactions between elementary particles. Topics will be chosen from perturbative quantum chromodynamics, the standard electroweak model, lattice field theory, grand unified models, supersymmetry and current research problems.
3 credits

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. Each course carries three credits, with repetitive credit permitted.

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

Dean Egon Neuberger
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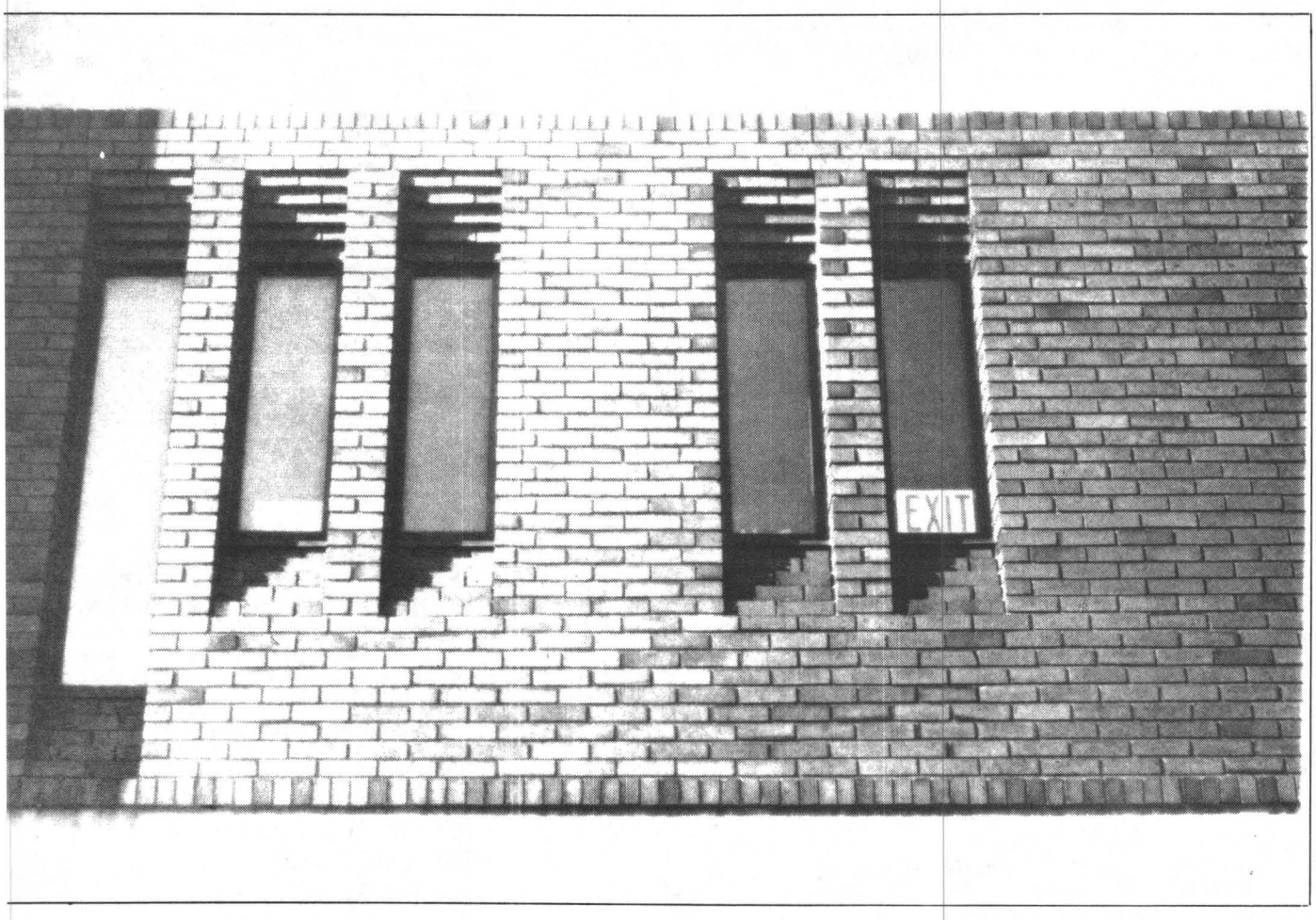


The Departments of Anthropology, Economics, History, Political Science, Psychology and Sociology and the Programs in Africana Studies and Labor/Management Studies constitute the Division of Social Sciences. Six of the departments offer high quality Ph.D. programs, and Linguistics has an excellent D.A. program, described in the following sections. Several departments and programs offer M.A. degrees; Labor/Management has an Advanced Certificate; and most departments and programs offer graduate courses through the Center for Continuing Education. The Division comprises approximately 170 professors, many of them with national and international distinction, 340 full-time Ph.D. students from all over the world, and a number of visiting faculty from leading universities in many countries. Several departments in the Division have been ranked very high 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)632-7610

Graduate Studies Director: Pedro Carrasco
Social and Behavioral Sciences Building S-529

Co-Director: William Jungers
Doctoral Program in Anthropological Sciences
Health Sciences Center TE-041 (516)444-3122

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, aerial 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, the Near East, and Long Island. 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 Anatomy 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 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. Computers are available for student use.

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 coursework, and 3.25 (where 3.0 = B) in the major field of concentration.

B. Results of the Graduate Record Examination (GRE) 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.

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

Every year the following introductory courses are offered:

Fall
ANT 501: Development of Anthropological Theory
ANT 515: Theory/Meth. Arch.
ANT 530: Physical Anthro.

Spring
ANT 520: Princ. Soc./Cult. Anthro.
ANT 578: Lang. Cult. Context
Four elective credits

When a student has completed this first-year program, a 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., Professor.[4-8] Ph.D., 1970, University of Virginia: Social anthropology; complex societies; social change; Africa.

Aronoff, Mark, 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 and Graduate Studies Director.[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 Emeritus. 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] 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.[4-6] 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.[4-8] 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.

Janson, Charles, Assistant Professor.[4-7] Ph.D., 1985, University of Washington: Primate behavior and ecology, sociobiology; tropical ecology.

Jonaitis, Aldona C., Associate Provost.[3-4] Ph.D., 1977, Columbia University: Art and architectural history; primitive, pre-Columbian, ancient Near Eastern art; Northwest Coast Indian art.

Jungers, William L., Associate Professor[1-4] and Graduate Studies Co-Director. Ph.D., 1976, University of Michigan: Primate and human evolution; functional morphology; biomechanics.

Kennedy, Theodore R., Associate Professor.[4] Ph.D., 1974, Princeton University: Afro-American culture, complex societies, family and kinship; Caribbean.

Krause, David W., Assistant Professor.[1-4-6] Ph.D., 1982, University of Michigan: Evolution form and function of mammalian dentition; evolutionary history; paleobiology of early mammals, particularly primates.

Larson, Susan, Research Assistant Professor.[1,4] Ph.D., 1982, University of Wisconsin, Madison: Functional morphology; size and scaling; growth and development.

Lightfoot, Kent, Assistant Professor.[4,6] Ph.D., 1981, Arizona State University: Archaeology of the American Southwest and New England; coastal adaptations; hunter and gatherer societies; village communities.

Martin, Lawrence, Assistant Professor.[4] Ph.D., 1983, University of London: Ape and human evolution; dental anthropology; material culture.

Mittermeier, Russell Alan, Adjunct Assistant Professor.[1,4] Ph.D., 1977, Harvard University: Primate ecology; primate conservation.

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.

Schuster, Ilsa, Assistant Professor.[4] Ph.D., 1977, University of Sussex: Urban problems, gender studies, development; Israel, Africa.

Sokal, Robert, Professor.[4,7] Ph.D., 1952, University of Chicago: Numerical taxonomy; theory of systematics; geographic variation; spatial models in ecology and evolution.

Sokoloff, Leon, Professor.[4] M.D., 1944, New York University: Arthritis and metabolic diseases of the bone; biomechanics of joint lubrication; aging in tissue culture.

Sridhar, S.N., Assistant Professor.[2,4] Ph.D., 1980, University of Illinois: Syntax; psycholinguistics; bi-lingualism; applied linguistics.

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., Associate 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.

Number of teaching, graduate and research assistants, fall 1985: 18

[1] *Anatomical Sciences*
[2] *Linguistics*
[3] *Art History*
[4] *Doctoral Program in Anthropological Sciences*
[5] *Brookhaven National Laboratory*
[6] *Anthropology Museum*
[7] *Ecology and Evolution*
[8] *On leave to Administration*

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.
4 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 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 an 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.
4 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. Some enthnographic monographs are discussed in terms of their relevance for the general concepts and principles treated in the seminar.
4 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.
4 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 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.
4 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: R. Bryce Hool
Social and Behavioral Sciences Building S601 (516)632-7560

Graduate Studies Director: Mark Walker
Social and Behavioral Sciences S649 (516)632-7530

The Ph.D. program in Economics 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.

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.

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 the 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. At least one year of introductory differential and integral calculus, with proficiency demonstrated by a grade of at least B in the courses.

C. Letters of recommendation from three instructors or academic advisors.

D. Submission of results of the Graduate Record Examination (GRE) 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 submitted before the preceding March 1 of that calendar year.

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. 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 and macroeconomics and one field, beginning at the end of the first year of study and to be completed by the end of the third 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, 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.

Coleman, Thomas, Assistant Professor. Ph.D., 1984, University of Chicago: Labor economics; econometrics.

Dawes, William, Assistant Professor. Ph.D., 1972, Purdue University: Econometrics; economic history.

Dusansky, Richard, Professor. Ph.D., 1969, Brown University: Public sector economics; microeconomic theory; health economics.

Garcia-Mila, Teresa, Assistant Professor. Ph.D., 1985, University of Minnesota: Macroeconomics; econometrics.

Gertler, Paul, Assistant Professor. Ph.D., 1985, 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, Professor and Chairperson. 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. 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.

McGuire, Therese, Assistant Professor. Ph.D., 1983, Princeton University: Public finance.

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.

Porter, Robert, Associate Professor. Ph.D., 1981, Princeton University: Industrial organization; microeconomics.

Rosenthal, Robert, Professor. Ph.D., 1971, Stanford University: Game theory; microeconomic theory.

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, Professor and Grduate Studies Director. Ph.D., 1970, Purdue University: Economic theory; mathematical economics; theory of economic systems.

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 1985: 56

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.
Corequisite: ECO 590
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.
Prerequisite: ECO 500
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 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.
Corequisite: ECO 500
Fall, 4 credits

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.
Corequisite: ECO 501
Prerequisite: ECO 510
Spring, 4 credits

ECO 520 Mathematical Statistics
The first semester of a one-year course in quantitative methods. Statistical methods and their properties of particular usefulness to economists. Topics include probability theory; univariate and multivariate distributions; limiting distributions; point and interval estimation; hypothesis testing.
Prerequisite: ECO 590
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.
Prerequisite: ECO 520
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 604 Game Theory and Economics
Introduction to both cooperative and non-cooperative games, with applications to perfect and imperfect economic competition, bargaining, and political theories.
Prerequisites: ECO 590 or AMS 504
Spring, 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.
Prerequisite: ECO 501
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
Prerequisite: ECO 501
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.
Prerequisites: ECO 501, ECO 511
2 credits

ECO 619 Studies in Macroeconomics
Prerequisites: ECO 501, ECO 511
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
Prerequisite: ECO 521
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.
Prerequisite: ECO 501
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.
Prerequisite: ECO 501
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.
Prerequisite: ECO 501
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 501
Fall, 2 credits

ECO 636 Industrial Organization I
Applications of microeconomic theory to the determinants of market structure. Relationships between market structure, firm behavior and allocational efficiency. Econometric estimation and testing of some hypotheses suggested by the theory.
Prerequisite: ECO 501, ECO 521
2 credits

ECO 637 Industrial Organization II
This course is a continuation of ECO 636. It will deal with the same questions and tools as ECO 636, and will also provide an introduction to anti-trust policy and to public policy toward industry, including regulation and deregulation, the design of optimal regulation, and the effectiveness of current regulation.
Prerequisites: ECO 501, 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.
Prerequisites: ECO 521, 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.
Corequisite: ECO 521
Prerequisite: ECO 501
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.
Corequisite: ECO 522
Prerequisite: 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.
Prerequisites: ECO 501, ECO 521
2 credits

ECO 647 Selected Topics in U.S. Economic History I
This course applies advanced economic theory to issues concerning the contribution of institu-

tional 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.
Prerequisite: ECO 501
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.
Prerequisites: ECO 501, ECO 511
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.
Prerequisite: ECO 501
2 credits

ECO 660 Comparative Economic Systems
A systematic treatment of systems analysis, stressing decision-making, information and motivation. A conceptual framework is developed for analyzing 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.
Corequisite: ECO 500
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.
Corequisite: ECO 501
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.
Prerequisites: ECO 501, ECO 510
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: Joel T. Rosenthal
Social and Behavioral Sciences Building N-309 (516)632-7502

Graduate Studies Director: Gary J. Marker
Social and Behavioral Sciences Building N-331B

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 coursework, and 3.00 (B) in history courses.

D. Letters of recommendation from three previous instructors.

E. Results of the Graduate Record Examination (GRE) 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 provide 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 six 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 fields of knowledge:

Field 1, Dissertation Field: An area of historical knowledge which includes 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 four graduate seminars beyond the M.A., two of which must be research seminars. In addition, each student is required to take a formal reading course and a thesis prospectus workshop. 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 fourth semester of post M.A. work.

B. Ph.D.-Level Seminars

There are two types of doctoral-level seminars: Reading (numbered above 500), which are principally discussion and written analysis of selected historical works; and Research (numbered above 600), which provide the opportunity for original research and writing of a substantial paper based on the research. In addition to regular courses, students may take directed readings with faculty members to cover specialized fields.

C. Thesis Prospectus Workshop

All Ph.D. students will be required to take the thesis prospectus 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 propectus 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.[3,4] 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.[5] Ph.D., 1957, Case-Western Reserve University: U.S. labor and socialism: immigration; history of photography.

Cowan, Ruth S., 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, Associate 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. 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.[6] 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., Associate Professor and Graduate Studies Director. 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 and Chairperson. 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., Associate Professor. 1978, University of Pennsylvania: 19th-century U.S. social; medicine, nursing and psychiatry; women and family.

Weinstein, Barbara, Associate Professor. Ph.D., 1980, Yale University: Brazil; modern Latin America; slave societies.

Weinstein, Fred, Professor. Ph.D., 1962, University of California, Berkeley: Psychohistory; theory in history; Russian history.

Weltsch, Ruben, Associate Professor. Ph.D., 1961, University of Colorado: Eastern Europe; the Reformation; Hapsburg Empire.

Williams, John 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 1984: 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, 1984-85*
[4] *Recipient of the State University at Stony Brook President's Award for Excellence in Teaching, 1984-85*
[5] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1978-79*
[6] *Recipient of the State University at Stony Brook President's Award for Excellence in Teaching, 1983-84.*

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 interpretations 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. Surveys 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 Political History

HIS 601 Research Seminar in Economic History

HIS 602 Research Seminar in Social History

HIS 603 Research Seminar in Intellectual and Cultural History

HIS 604–610, 615–617 Research Seminars in Europe History Since 1500

HIS 621–634 Topical Research Seminars in United States History

HIS 641–645 Topical Research Seminars in Latin American History

HIS 652–655 Topical Research Seminars in English History

HIS 661 Topical 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 Prospectus 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)632-7775

Graduate Studies Director: Frank Anshen
Social and Behavioral Sciences Building N-513 (516)632-7776

The Department of Linguistics 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 is designed 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 requirements 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. New applications will be considered for the fall semester only.

Facilities

The Department of Linguistics 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 (GRE) 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 only 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.

Admission to the D.A. Program

For admission 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. GRE 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 only 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 TESOL

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.	Three of the following:	9
	LIN 525 Contrastive Analysis	
	LIN 526 Analysis of an Uncommonly Taught Language	
	LIN 531 Language Testing	
	LIN 532 Second Language Acquisition	
	LIN 541 Bilingualism	
	LIN 542 Sociolinguistics	
3.	One elective course approved by the department	3
	Total	30

B. Comprehensive Examination

Successful completion of a comprehensive examination is required.

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 M.A. Degree in Applied Linguistics

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

A. Course Requirements
A total of 30 graduate credits, including:
LIN 521 Syntax
LIN 522 Phonetics
LIN 523 Phonology and Morphology
Other courses will be chosen from the student's major area of interest, and must be approved by the student's advisor.

B. Thesis
A thesis, to be written under the supervision of a thesis committee. The thesis must be approved by that committee.

C. Language Requirement
Proficiency in English and a reading knowledge of one other language.

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 six transfer credits may be recognized for non-SUNY candidates and nine 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., 1967, New York University: Teaching English to speakers of other languages.

Anshen, Frank, Associate Professor and Graduate Studies Director. Ph.D., 1968, New York University: Sociolinguistics.

Aronoff, Mark, Professor and Chairperson. Ph.D., 1974 Massachusetts Institute of Technology: Morphology; orthography.

Bethin, Christina Y., Associate 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.

Finer, Daniel L., Assistant Professor. Ph.D., 1984, University of Massachusetts, Amherst: Syntax; semantics; language acquisition.

Hoberman, Robert, Assistant Professor. Ph.D., 1983, University of Chicago: Semitic linguistics.

Sridhar, S. N., Associate 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 1985: 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.
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.
Prerequisite: LIN 522
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.
Prerequisite: LIN 522
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.
Pre- or corequisite: LIN 521 and LIN 522, or permission of instructor
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.
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.
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.
3 credits

LIN 541 Bilingualism
Study of the social, linguistic, educational, and psychological aspects of bilingualism.
3 credits

LIN 542 Sociolinguistics
An introduction to major topics in sociolinguistics, including variation theory, language attitudes, language planning, language change, and pidgins and creoles.
3 credits

LIN 550 Selected Topics in Linguistics
Topics will be announced each semester. The course may be repeated for credit if topic differs.
Fall and spring, 3 credits each semester

LIN 555 Error Analysis
Study of the systematic errors made by foreign language learners and the potential of various linguistic theories to predict and account for these errors.
Prerequisites: LIN 521, LIN 522, and LIN 525, or permission of instructor
3 credits

LIN 571 Practicum in TESOL I
Each student will have primary responsibility for teaching a section of English as a Second Language under the supervision of a member of the Linguistics Department.
Fall and spring, 3 credits each semester

LIN 572 Practicum in TESOL II
Each student will have primary responsibility for teaching a section of English as a Second Language under the supervision of a member of the Linguistics Department.
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 (ethno-linguistics, sociolinguistics), language and cultural change, language and mind, language acquisition. Crosslisted with ANT 578.
Spring, 3 credits

LIN 591 Directed Readings
Students read and evaluate the literature on a topic of special academic interest or professional relevance under the direction of a faculty member.
Prerequisite: Permission of instructor
1-3 credits, repetitive

LIN 592 Directed Research
Students conduct research on a topic of special academic interest or professional relevance under the direction of a faculty member.
Prerequisite: Permission of instructor
1-3 credits, repetitive

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 and spring, 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

DLT 680 Doctoral Seminar
Doctoral candidates will present and discuss their own research work.
Prerequisite: Advanced standing
Fall and spring, 3 credits each semester

Political Science

(POL)

Chairperson: Mark Schneider
Social and Behavioral Sciences Building S-7111 (516)632-7660

Graduate Studies Director: James Enelow
Social and Behavioral Sciences Building S-723 (516)632-7638

Master's Program in Political Science

The Department of Political Science offers a graduate program leading to the Ph.D. degree. For students interested in a master's degree, the department contributes to the Harriman College M.S. degree program in Policy Analysis and Public Management, which has a concentration in government designed to prepare students for careers in public affairs (see section of this *Bulletin* on Harriman College). The Political Science Department also grants an M.A. degree as a sign of progress toward the doctorate.

Ph.D. Program in Political Science

The Ph.D. program at Stony Brook is characterized by several distinct features:

A. Three areas of specialization: a) Political Psychology; b) Public Policy; c) American Government.

B. Close student/faculty interaction.

C. An emphasis on professional training of research-oriented students and the production of professional quality articles and conference papers by Ph.D. students.

Political Psychology/Behavior

The doctoral concentration in political psychology/behavior 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 limited 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 expose students to the latest analytical and methodological skills in the study of public policy, (2) to expose students 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, the concentration allows students opportunities to design policy specializations 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 activists 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, from professional colleagues or from faculty.

D. The Graduate Record Examination (GRE) 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 GRE 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.

Degree Requirements

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 Graduate Studies Director for permission to waive the requirement for POL 511. It is up to the Graduate 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. Core Courses

Students take three core courses:

1. POL 550: American Government
2. POL 533: Administration and Public Policy
3. POL 560: Political Psychology.

B. Methods

Students are expected to master the methods necessary to engage in scholarly work:

1. All students take one year's statistics/methods sequence (POL 603-604), during their first year, unless they have had the equivalent graduate level training.
2. American government and policy students also take ECO 320-321, an undergraduate econometrics sequence, usually during their second year. American government and policy students are further required to take at least one advanced methods course either in this department or in a cognate field (e.g., economics). The student's choice of advanced elective(s) is decided in conjunction with the student's advisor.
3. Political Psychology students take Psychology 501, a graduate level course in Experimental Design. They are also required to take an additional advanced methods course, chosen in conjunction with their advisor.
4. Students who have attended the ICPSR Summer Program in Quantitative Methods at the University of Michigan can have the advanced elective requirement waived.

C. Electives

Students take a series of advanced seminars in their area of specialization. These seminars can be within the department or can be in cognate fields such as psychology, economics, or applied math. The selection of the actual course of study is arrived at by the student in consultation with his/her advisor. The student usually takes between 12-16 courses before taking comprehensive examinations, normally in the spring semester of a student's third year.

D. First-year Evaluation

Graduate students in the Ph.D. program are formally evaluated in the middle of the second semester of graduate work. The First-year Evaluation Committee for each student is composed of faculty members with whom the student has worked—both in courses and in a teaching/research capacity. In most cases, this means the committee will be composed mostly of the faculty who have taught the core courses.

The committee's charge is to make one of the following three possible determinations with regard to the student's progress: (a) recommend continuation of graduate study toward the Ph.D. (b) recommend that the student be allowed to continue toward a terminal M.A. but not to continue in the Ph.D. Program, (c) recommend that the student not be permitted to enroll in additional graduate courses in the department.

The first-year evaluation also serves as the basis for the decision on whether the student is to receive financial support during subsequent semesters of graduate work.

E. Comprehensive Examinations

1. Timing of Examinations
   Students making normal progress toward the Ph.D. should anticipate taking comprehensive examinations no later than the end of the third year of coursework. Examinations in three fields compose the doctoral comprehensive examinations.
2. Examination Fields
   The Department's policy is to allow students to take exams only in those areas in which its faculty strengths allow in-depth training. In concrete terms, at present, students take exams in the following fields:
   - Methods
   - American Government
   - Public Policy
   - Political Psychology

   All students are required to take the methods exam. Students then prepare two of the three substantive areas for written examination.
3. Preparation and Evaluation of Examinations
   The Graduate Studies Director appoints a committee (with a designated committee chairperson) responsible for each examination field. The committee prepares the written examination, providing sufficient options for questions on which students may write. The committee members read the student's examination and prepare an evaluation of that performance.
4. Dissertation Examination Committee
   Upon successful completion of the Comprehensive Examinations, the student begins the formal process of preparing his/her dissertation.

   The student, in consultation with his/her faculty advisor and the Graduate Studies Director, selects a Dissertation Committee of four faculty members—three from the Department of Political Science and one with whom the student has worked from outside the department.

   In consultation with the committee and with the guidance of the advisor, the student prepares a formal dissertation proposal. This proposal is formally presented to the committee, usually within three months of the successful completion of the comprehensive examinations. The Dissertation Committee must accept the proposal. If the committee rejects the proposal, a candidate is allowed to revise the proposal for a subsequent defense. If this second attempt also results in failure, the student's program is terminated.

   Upon successful conclusion of research, the student defends the completed dissertation to the committee and the University community-at-large.

Faculty

Abramowitz, Alan I., Associate Professor. Ph.D., 1976, Stanford University: American government.

Baumann, Philip R., Assistant Professor. Ph.D., 1983, Michigan State University: International and comparative politics; research methods.

Brodkin, Evelyn Z., Assistant Professor. Ph.D., 1983, Massachusetts Institute of Technology: American politics; public policy; bureaucracy; social policy.

Cameron, Charles M., Lecturer. Ph.D. expected 1986, Princeton University: American politics and policy: political economy.

Cover, Albert D., Associate Professor. Ph.D., 1976, Yale University: American politics.

Enelow, James M. Associate Professor and Graduate Studies Director. Ph.D., 1977, University of Rochester. Positive theory; models of decision making; Congress; presidential elections.

Iyengar, Shanto, Associate Professor. Ph.D., 1972, University of Iowa: Political psychology; mass communication, public opinion; political behavior; research design and methodology.

Koppelman, Lee E., Professor. Ph.D., 1967, New York University: Comprehensive regional and urban planning, environmental planning, intergovernmental relations and American Federalism; coastal zone planning and analysis.

Lodge, Milton G., Professor. Ph.D., 1967, University of Michigan: Political psychology; political cognition.

McGraw, Kathleen M., Assistant Professor. Ph.D., 1985, Northwestern Univesity: Social psychology, social cognition, research methods, psychology and the law, psychology of women.

Myers, Frank., Professor. Ph.D., 1965, Columbia University: Comparative politics; political theory.

Norpoth, Helmut, Professor. Ph.D., 1974, University of Michigan: Electoral behavior; political economy; Time Series methodology; comparative politics.

Scarrow, Howard A., Professor. Ph.D., 1954, Duke University. Political parties and elections; New York State politics and elections; British politics and elections.

Schneider, Mark S., Professor and Chairperson. Ph.D., 1974, University of North Carolina: Urban public policy; urban service delivery; administration and public policy.

Scholz, John T., Associate Professor. Ph.D., 1977, University of California, Berkeley: Public policy and administration, regulation.

Segal, Jeffrey A., Assistant Professor. Ph.D., 1983, Michigan State University: American institutions, constitutional processes; econometrics; law, judicial research methodology.

Thapa, Rajendra B., Assistant Professor. Ph.D., 1983, University of Missouri: International relations and world politics, comparative politics, international political economy.

Travis, Martin B., Professor. Ph.D., 1948, University of Chicago: International law and international relations; Latin America; the Middle East.

Tursky, Bernard, Professor Emeritus. Diploma, 1954, Lowell Institute, Masssachusetts Institute of Technology: Political psychology; psychophysiology; scaling; behavioral medicine and biofeedback.

Williams, Jay C., Jr., Professor Emeritus. Ph.D., 1955, University of Chicago: Political theory; political propaganda.

Number of teaching, graduate and research assistants, fall 1985: 21

Courses

M.A. PROGRAM COURSES

Courses are open to qualified students from other programs with permission of the Graduate Studies 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.
Fall, 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
Spring, 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.
Fall, 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 Graduate Studies Director
Spring, 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.
Spring, 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.
Spring, 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.
Fall, 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.
Fall, 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.
Spring, 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.
Fall, 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.
Spring, 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.
Spring, 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 discussed, 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.
Spring, 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.
Spring, 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.
Summer, 6 credits, grading S, U

POL 597 Directed Reading
Specialized tutorials based upon goals agreed to by instructor and student.
Fall and spring, 1-6 credits each semester, grading S, U

POL 598 Thesis Registration
Spring and fall, 1 credit, repetitive, grading S, U

POL 599 Independent Study
This course can be arranged between a student and faculty member for the purpose of allowing the student to pursue independently supervised research, at the master's level.
Fall and spring, 1-6 credits, variable and repetitive

DOCTORAL PROGRAM IN POLITICAL SCIENCE

POL 550 Foundations: American Politics
A review of the basic political science literature on American politics, with emphasis on American political institutions.
3 credits

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.
Spring, 3 credits

POL 552 Foundations: Public Policy
An 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 may be investigated.
Fall, 3 credits

POL 553 Foundations: Comparative/ International
Survey and evaluation of the major theoretical approaches, issues and problems in comparative political analysis. The course examines such areas as political development, empirical democratic theory, or political socialization, along with a detailed examination of one or more selected non-American political systems.
Spring, 3 credits

POL 557 Seminar on Political and Administrative Design-Making
An exploration of approaches to the study of political choice. Topics include: decision theory, bargaining and negotiation, rationality, the political context of decisions, decision tools, the empirical study of decision-making, social criticism and the decisionist perspective.
Spring, 3 credits

POL 560 Political Psychology I
A survey of the political psychology literature, with emphasis on the application of conceptual and methodological approaches from social and experimental psychology to the analysis of political behavior.
Fall, 3 credits

POL 561 Political Psychololgy II
A survey of the political psychology literature, with emphasis on the psychophysical, psychophysiological and behavioral measurement of political variables.
Prerequisite: POL 560
Spring, 3 credits

POL 562 Laboratory and Field Instrumentation
An introduction to real-time applications of minicomputers in laboratory experimentation, including a review of experimental design, techniques (factoral, Latin, square, etc.) and the design and use of laboratory instrumentation. Each student will design and conduct a series of laboratory experiments which will explore the capabilities and problems of computer experimentation.
Fall, 3 credits

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.
Prerequisite: Permission of the Graduate Studies Director
Fall, 3 credits, grading S, U

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.
Fall, 3 credits

POL 604 Applied Data Analysis II
A continuation of POL 603 with emphasis on methodological assumptions and problems: correlation; analysis of variance; simple and multiple regression.
Prerequisite: POL 603 or equivalent
Spring, 3 credits

POL 605 Philosophy and Social Science
A survey and critical evaluation of the major philosophical perspectives on the nature of science in politics. The course offers an in-depth introduction to 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.
Fall, 3 credits

POL 610 Research Practicum I
A course actively involving students in an ongoing research project under the direction of a 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.
Fall, 3 credits, grading S, U

POL 611 Research Practicum II
A continuation of POL 610. Students actively participate in either a second research project, where they will again prepare a research report, or continue their participation in the same project, where they will then be assigned a subset of data for analysis or carry out a specific research aim of the project.
Prerequisite: POL 610
Spring, 3 credits, grading S, U

POL 613 Introduction to Public Choice
An introduction to public choice theory with empirical applications. Main areas to be covered are: models of voting and decision theory as general models of political decision making, social choice theory as a normative tool for analyzing voting systems. Empirical applications will focus primarily on American presidential elections.
Spring, 3 credits

POL 614 American Judiciary
A seminar on judicial process and behavior. Emphasis will be placed on the Supreme Court, but trial courts and other appellate courts will be examined as well. Topics will include Constitutional interpretation, and both legal and extralegal models of decision making. Students should possess basic methodological skills.
Fall, 3 credits

POL 615 Legislative Process
A seminar on the legislative process, focusing on current research on the U.S. Congress.
Fall, 3 credits

POL 616 Political Parties and Elections
A seminar on parties, campaigns, and elections in the United States. Topics to be covered include party organization and leadership, nomination and general election campaigns, and the role of parties in government.
Fall, 3 credits

POL 617 Decision Making in Organizations
A seminar on decision procedures in public and private organizations. The course begins with the rational choice model developed primarily in economics and policy analysis, then considers common problems of decision making arising from limited capabilities, conflicts among organization members, and uncertainties and ambiguity in the organization's environment. Readings are from several disciplines.
Fall, 3 credits

POL 618 Social Policy
A seminar exploring developments in social policy within the context of welfare state politics. The seminar reviews theoretical explanations for development of the American welfare state, its tensions, contradictions and dilemmas. It also investigates selected substantive areas of social welfare policy.
Spring, 3 credits.

POL 619 Government Regulation of Business
An examination of the scope of government regulation of business in the U.S. The course compares alternative explanations for regulatory agency failures as well as explanations for why some regulatory agencies perform better than others. Finally, the course considers proposed reforms, such as clearer legislative standards and deregulation.
Fall, 3 credits

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: Permission of Graduate Studies Director

POL 622 Bureaucracy and the Policy Process
An examination of bureaucracy as part of the policy making process. This course reviews theoretical explanations for the bureaucracy as a political institution and implications of its rapid growth since the New Deal. It also looks inside bureaucratic organizations, examining factors that influence the exercise of discretion and policy implementation.
Fall, 3 credits

POL 625 Advanced Topics in Comparative Politics I
Readings and research papers on topics in comparative politics. Particular attention is given to concepts and methods identified with the field.
Prerequisite: POL 553
Fall, 3 credits, repetitive

POL 626 Advanced Topics in Comparative Politics II
A continuation of POL 625.
Prerequisite: POL 625
Spring, 3 credits

POL 658 Political Attitudes and Attitude Change
The content, structure, determinants and behavioral consequences of political attitudes are examined. Particular focus will be given to testing hypotheses about attitude formation and change. Attitude research methods will be studied for the purpose of empirically testing hypotheses.
Fall, 3 credits

POL 660 Advanced Topics in Political Psychology/Behavior I
Review of the literature and methods related to a single topic or problem in contemporary political science, voting behavior, issue formation, interest groups, political economy or personality.
Prerequisite: POL 550, 551
Fall, alternate years, 3 credits, repetitive

POL 661 Advanced Topics in Political Psychology/Behavior
A continuation of POL 660.
Prerequisite: POL 660
Spring, 3 credits

POL 662 Group Decision Models
Topics to be discussed include the theory of games, individual choice theory and social choice theory. The purpose of the course is to show how these models aid our understanding of politics.
Spring, 3 credits

POL 663 Campaigns & Voting
An investigation of 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.
Prerequisite: Permission of Graduate Studies Director
Spring, 3 credits

POL 664 Political Information Processing
A survey of contemporary psychological models of information processing, with emphasis on experimental applications to the analysis of the content and structure of political concepts.
Spring, 3 credits

POL 665 Advanced Topics in Political Analysis I
A course reviewing the literature and methodology of specific areas of political science research. The course will relate directly to research applications and provide students with an opportunity to apply advanced research tools to selected substantive problems.
Prerequisite: Permission of Graduate Studies Director
Fall, alternate years, 3 credits, repetitive

POL 666 Advanced Topics in Political Analysis II
A continuation of POL 665.
Prerequisite: POL 665
Spring, 3 credits

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: Permission of Graduate Studies Director
Fall, 3 credits, repetitive

POL 671 Advanced Topics in Public Policy Analysis II
A continuation of POL 670.
Prerequisite: POL 670
Spring, 3 credits

POL 672 Urban and Suburban Growth Policy
Urban and suburban community growth and the 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 policies presently being practiced.
Prerequisite: Permission of Graduate Studies Director
Spring, 3 credits

POL 673 Advanced Topics in American Politics I
A seminar in American institutions and processes, focusing current research in such areas as Congress, the Supreme Court, presidency, political parties or bureaucracy.
Prerequisite: POL 550
Fall, 3 credits, repetitive

POL 674 Advanced Topics in American Politics II
A continuation of POL 673.
Prerequisite: POL 673
Spring, 3 credits

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.
Prerequisite: Permission of Graduate Studies Director
Fall, alternate years, 3 credits, repetitive

POL 676 Advanced Topics in Governmental Institutions II
A continuation of POL 675.
Prerequisite: POL 675
Spring, alternate years, 3 credits

POL 677 Political Elites
A critical review of established and new theoretical approaches and methodological orientations to the study of political elites.
Spring, 3 credits

POL 680 Independent Study
Prerequisite: Permission of instructor
Fall and spring, 1-6 credits, repetitive

POL 681 Independent Study
Prerequisite: Permission of instructor
Fall and spring, 1-6 credits, repetitive, grading S, U

POL 699 Doctoral Dissertation Research
Prerequisite: Permission of Ph.D. Director
Fall and spring, 1-9 credits, repetitive, grading S, U

Psychology
(PSY)

Chairperson: Edward S. Katkin
Psychology B 175 (516)632-7805

Graduate Studies Director: Nancy Squires
Psychology B 154 (516)632-7814

The Psychology Ph.D. program includes studies in Biopsychology, Clinical, Developmental, Experimental, and Social Psychology, within which students may wish to concentrate in areas such as Applied Child and Family Studies, Cognitive, Health Psychology/Behavioral Medicine, or Quantitative Methods. A detailed description of the graduate program, including requirements for students in each area of graduate studies, is available from the departmental graduate office. The doctoral program is registered for licensure in Psychology with the New York State Education Department, and Stony Brook's specialization in Clinical Psychology is approved by the American Psychological Association.

In all areas the primary emphasis is on research training, through research, advisement and apprenticeship. Students are encourged 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 for a selected faculty member to serve as research advisor; this need not be the student's initially assigned advisor and may be a faculty member outside the student's area of studies.

Transfer between areas of graduate studies requires approval of a formal application. Doctoral students may receive an M.A. in General Psychology in the course of their training and students unable to complete their doctoral studies in the field to which they were admitted may be permitted to complete the M.A. requirements (in General Psychology). The program does not admit students for a terminal master's degree in General Psychology.

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 five 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. 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.

Microcomputers are available in departmental laboratories, in addition to those used for sponsored research and undergraduate laboratory courses. In addition to departmental CRT terminals there are additional terminals and printers for use with the central campus computer in the Division's *Social Science Data Laboratory,* as well as an extensive microcomputer facility in the Social and Behavioral Sciences Building for use in both graduate and undergraduate instruction.

Admission

The requirements for admission to doctoral study, 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 3.5 or better in all graded academic undergraduate coursework *or* a General Record Examination (GRE) General Test score of 1250 or better. Clinical psychology students must have a 3.5 average *and* a 1250 GRE score.

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 GRE General Test are required; Advanced Test results are strongly recommended for undergraduate psychology majors.

F. Foreign nationals must provide TOEFL or ALIGU 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. The deadline for receipt of applications and all supporting materials for fall admission is March 1. 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):

A. Course Requirements

A student must maintain a graduate GPA of at least 3.0 and 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: Neuropsychology, and Comparative Behavior (Biopsychology); 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); Contemporary Issues in Social and Community Psychology (Social); and History of Psychology (General). In addition two semesters of First Year Lectures (no credit), and a one-credit practicum in statistical computer applications are required. Following admmission students with graduate training elsewhere can petition to satisfy course requirements on the basis of their previous graduate work. Petition to waive requirements above, or to satisfy them on the basis of previous graduate work, should be directed to the Psychology Graduate Office. 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.

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 (see *A*) 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 nine thereafter.

F. Dissertation
The approval of the dissertation proposal and successful oral defense of the completed thesis are required.

G. General
While these and the requirements of the student's area certainly guide graduate student 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 10 hours/week research activities, under the supervision or guidance of a research advisor (see *D*). 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*) 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 have 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

Birns, Beverly, Professor. 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., Professor. Ph.D., 1973, University of California, San Diego: Developmental disabilities, language acquisition processes, and child development.

Cohen, David, Professor.[2] 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.

D'Zurilla, Thomas, Associate Professor. Ph.D., 1964, University of Illinois, Urbana: Effects of training in social problem-solving skills on social competence and maladaptive behavior; development of assessment measures of social problem-solving skills; evaluation of a problem-solving approach to stress management.

Emmerich, David S., Associate Professor. 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, Associate Professor. Ph.D., 1979, Massachusetts Institute of Technology: Nature and function of mental imagery and of visual attention, information-processing constraints on perception and cognition, mental representation of spatial relationships, constraints on visual acuity, functional dissociations in visual processes, visual control of bodily orientation, visual-motor coordination and adaptation, feedback in motor control and development of visually guided behavior.

Friedman, Richard, Assistant Professor.[3] Ph.D., 1975, State University of New York at Stony Brook: Behavioral, physiologic, and biochemical characteristics of Dahl hypertension-sensitive rats, human hypertension.

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.[1] Ph.D., 1969, University of Chicago: Behavior; marriage and the family; social change.

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.[3] M.D., 1961, Johns Hopkins University School of Medicine: Human sexuality and gender identity.

Katkin, Edward S., Professor and Chairperson. Ph.D., 1963, Duke University: Psychophysiology, autonomic nervous system response distress, behavioral medicine, and individual differences in risk for cardiovascular disease.

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, social planning/networking); and 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 responses (e.g., tics, stuttering, pain); conceptualization in psychotherapy.

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., Associate Professor. Ph.D., 1978, Harvard University: Learning and motivation, with emphasis on self-control, quantitative analysis of choice, history of behaviorism, and food aversion and preferences.

Loney, Jan, Professor.[3] 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.

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. 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, memory development, metacognition.

O'Leary, K. Daniel, Professor. Ph.D., 1967, University of Illinois: Etiology and treatment of marital discord, spouse abuse, and hyperactivity; 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; also theoretical and applied research on self-control and punishment with children at on-campus or local public schools and in the home.

Peterson, Mary A., Assistant Professor, Ph.D., 1983, Columbia University: Object perception, attention, mental structures.

Petry, Heywood M., Assistant Professor. Ph.D., 1981, Brown University: Neuroanatomy and physiology of visual pathways; color vision and color blindness in humans and animals; development and plasticity of visual mechanisms.

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.

Sprafkin, Joyce, Assistant Professor.[3] Ph.D., 1975, State University of New York at Stony Brook: Effects of television on normal and handicapped children.

Squires, Nancy, Associate Professor and Graduate Studies Director. 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. Ph.D, 1950, University of Southern California: Human steady potentials, experimental neuropsychology. Adjunct staff, Division of Neurology, Nassau County Medical Center, NY.

Stone, Arthur A., Assistant Professor.[3] Ph.D., 1978, State University of New York at Stony Brook: Stress, coping, and illness; immune system functioning and health.

Valins, Stuart, Professor. Ph.D., 1964, Columbia University: Social ecology with an emphasis on group and individual processes.

Waters, Everett, Associate Professor. Ph.D., 1977, University of Minnesota: Human infancy as well as personality and social development; 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.

Weidner, Gerdi, Assistant Professor. Ph.D., 1981, Kansas State University: Development aspects of Type A behavior and other coronary risk factors; life style and illness; cardiovascular reactivity to stress.

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 communication skills in childhood, and delayed language development.

Wood, Joanne V., Assistant Professor. Ph.D., 1984, University of California, Los Angeles: Cognitive processes in adjustment to life events, including chronic illness; self-schemata in behavior change.

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 1985: 104

[1] *Joint appointment with Department of Sociology*
[2] *Joint appointment with Department of Neurobiology and Behavior*
[3] *Joint appointment with Department of Psychiatry*

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 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 526 Infancy
An analysis of theoretical models and empirical investigations of infants' development. Perceptual, cognitive, affective, and social attainments in infancy will be examined. The question of whether experiences in infancy critically affect later development will be considered in depth.
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 535 Advanced Research Methods
Advanced research methods employed in clinical, personality, social, and behavioral research.
Prerequisites: PSY 501, 502, and clinical doctoral student
Annually, 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
Covers 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 behavior. Consideration of anatomical, electrophysiological (EEG) and pharmacological correlates of behavioral functions such 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 566 Physiological Psychology Laboratory
Training in modern and traditional neurophysiological methods used to study neural basis of behavior. Exercises emphasize electrophysiological recording techniques (such as single-unit microelectrode recording, topographic mapping of sensory and/or motor areas in cortex and gross potential recording) in vertebrates and invertebrates, but include microelectrode fabrication, electronic instrumentation and mammalian brain dissection.
Spring, biennially, 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 are 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 reports.
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 Psychology students not advanced to candidacy.
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 592 Proseminar in Applied Child and Family Research
Designed for students associated with the concentration in applied child and family studies, to introduce conceptual and methodological issues in research on prevention and amelioration of problems experienced by children and families. Students and faculty define problems that require solution and the proseminar focusses on these problems. Students register for three credits during two semesters of active involvement in organizing presentations, otherwise for one credit.
Fall and spring, 1-3 credits, repetitive

PSY 593 Normal Problems of Child Rearing
A critical review of research on the causes and treatment of common problems in child rearing, with particular focus on understanding these problems in the context of research on normal development. Topics include sleep disturbances, toileting, discipline, peer interactions, agression, school and language problems.
Fall or spring, biennially, 3 credits

PSY 594 Psychology of Women
Theoretical approaches to the psychology of women including Freud, Horney, Thompson, Horner, and Rossi. Women and the life cycle from adolescence to old age. Included are adolescent identity formation, female sexuality, marriage, childbirth, motherhood, and problems of middle and old age. Women in psychology textbooks—truth or fantasy? Women and psychopathology and psychotherapy. The psychology of the "New Woman."
Fall or spring, biennially, 3 credits

PSY 595 Functional Analysis of Child Behavior
A functional analysis of behavior excesses and behavior deficits in children, with particular emphasis on the interface between developmental and behavioral psychology.
Fall or spring, biennially, 3 credits

PSY 596 Deviant Development
A critical review of contemporary research on factors that contribute to the development of deviations from the norm for cognitive, affective, and behavioral functions in infants, children, and adolescents. Antecedent conditions to be considered are genetic, constitutional, nutritional, pharmacological, and societal factors, as well as those dealing with the influence of parents, peers, and school.
Fall or spring, biennially, 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, variable and repetitive credit

PSY 605 Orientation to Clinical Psychology
Ethics, professional issues and ongoing faculty research. Required of all first year clinical students.
Fall and spring, 0 credits

PSY 608 Clinical Neuropsychology Internship
Qualified students specializing in neuropsychology carry out supervised responsibilities in an approved clinical neuropsychology facility.
Fall and spring, 1-12 credits

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 699 Doctoral Research
Prerequisite: Advancement to candidacy
Variable and repetitive credit

Sociology
(SOC)

Acting Chairperson (1986-87): Andrea Tyree

Chairperson: Norman Goodman
Social and Behavioral Sciences Building S-409

Graduate Studies Director: Eviatar Zerubavel
Social and Behavioral Sciences Building S-415 (516)632-7702

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 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 use by 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 Examination (GRE). International students, in addition to taking the GRE, 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 nine 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 individual research work outside formal courses but under the supervision of faculty members.

B. Courses

Course requirements for a Ph.D. in sociology include four designated courses, two in sociological theory and two in research methods taken in the first year of graduate study. Of an additional 10 required courses, one must provide additional methodological training and can be chosen by the student from a variety of suitable offerings specified by the department. Three of the remaining nine required courses can be waived by a student selecting one of the "outside department" options.

These options include (1) demonstrating proficiency in a modern language by passing a suitable examination, (2) demonstrating proficiency in mathematics by passing a suitable examination, (3) completing with at least a B average a program of three graduate courses in other departments.

During the first year of study all full-time students take eight courses. These must include two two-course sequences, one in sociological theory (SOC 505 and 506) and one in statistics and research methods (SOC 501 and 502). Ordinarily, two of the eight courses (one each semester) will consist of independent readings or, for those holding graduate traineeships, 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. Two 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 the writing option (Section D, Option 2) for the Ph.D. program.

D. Professional Competence Options

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 performance is satisfactory in all aspects, may be permitted to take a terminal M.A. by completing 30 credits of graduate coursework and submitting an acceptable research report. Upon passing the comprehensive examination, the student must submit a research report that demonstrates ability to analyze empirical data and to present findings clearly and systematically. Upon successful completion of all of the above requirements, along with completion of a minimum of 30 hours of graduate credit, the department will recommend to the Vice Provost for Research and Graduate Studies that the student be awarded the M.A. degree as a sign of progress toward the Ph.D. Recipients of the terminal M.A. will not be granted permission to continue.

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 three papers are designed to demonstrate three kinds of skills:

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. In the fall of their third year, students enroll in a teaching practicum to prepare them to teach their own course, under supervision, the following semester.

F. Preliminary Examination
This takes the form of an oral examination in the student's specialty to be given only after all the above requirements have been met. It is designed to appraise the 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.

G. Advancement to Candidacy
The department's recommendation that a student be advanced to candidacy for the Ph.D. is based on passing the preliminary examination and approval of a dissertation proposal.

H. 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.

Joint M.S.W. and Sociology Ph.D. Program

The Sociology Department cooperates with the School of Social Welfare in offering a joint M.S.W./Ph.D. in Sociology for persons wanting to pursue research careers in social welfare. The two programs are articulated so that some of the requirements of each can be met by work done in the other. A student applying for the joint program must independently meet the admission requirements of each program and must pursue the PARS (Planning, Administration, and Research) concentration within the School of Social Welfare.

Faculty

Arjomand, Said, Associate Professor.[1] 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 contemporary sociological theory.

Barthel, Diane, Associate Professor and Director of Undergraduate Studies. Ph.D., 1977, Harvard University: Urban; community; race; sex roles; policy and evaluation research.

Cerulo, Karen, Assistant Professor. Ph.D., 1985, Princeton University: Sociology of culture; mass communications; social psychology; design and research methods.

Chase, Ivan, Associate Professor.[2] 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 Emeritus. Ph.D., 1954, Columbia University: Theory; conflict and violence; intellectual life; knowledge.

Coser, Rose L., Professor Emerita. Ph.D., 1957, Columbia University: Family; women's roles, medical.

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, Distinguished Teaching Professor and Chairperson.[4] Ph.D., 1963, New York University: Social psychology; family; socialization.

Granovetter, Mark, Professor.[5] Ph.D., 1970, Harvard University: Theory; political; economic.

Halle, David, Assistant Professor. Ph.D., 1978, Columbia University: Sociology of work; political theory; social change.

Hallowell, Lyle, Assistant Professor. 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: Philosophy of social sciences; history and development of sociological theory; philosophy.

Kimmel, Michael, Assistant Professor.[6] Ph.D., 1981, University of California, Berkeley: Social change and development; political, social movements.

Romo, Frank, Assistant Professor. Ph.D., 1986, Yale University: Research methods; social control; social organizations; deviance.

Roos, Patricia, Assistant Professor.[7] 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, Professor.[8] Ph.D., 1971, Harvard University: Mathematical models; historical; political.

Selvin, Hanan, Professor Emeritus. Ph.D., 1956, Columbia University: Methodology, higher education; statistics.

Spanier, Graham B., Professor.[9] Ph.D., 1973, Northwestern University: Marriage and the family; life-span development; social policy and application of family research; research methodology.

Tanur, Judith, Professor. Ph.D., 1972, State University of New York at Stony Brook: Statistics; methodology; social psychology.

Tyree, Andrea, Professor and Acting Chairperson (1986-87). Graduate Studies Director. Ph.D., 1968, University of Chicago: Demography; social stratification; occupations.

Vogel, Mary, Assistant Professor. Ph.D., 1986, Harvard University: Law, social theory and public policy.

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.

Zerubavel, Eviatar, Professor and Graduate Studies Director. Ph.D., 1976, University of Pennsylvania: Time; language and cognition; interpersonal relations; theory.

Number of teaching, graduate and research assistants, fall 1985: 52

[1] *On sabbatical, spring 1987 semester.*
[2] *On sabbatical, fall 1986 semester.*
[3] *Joint appointment, Department of Psychology.*
[4] *On sabbatical, academic year 1986-87. Recipient of the State University Chancellor's Award for Excellence in Teaching, 1975-76.*
[5] *On sabbatical, academic year 1986-87.*
[6] *On leave, academic year 1986-87.*
[7] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1985-86 and President's Award for Excellence in Teaching, 1985-86.*
[8] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1974-75.*
[9] *Joint appointment, Department of Psychiatry.*

Courses

SOC 501, 502 Research Design and Statistics
A review of the main statistical techniques used in sociological research. Discussion of and practical experience in the design of sociological research.
3 credits each semester

SOC 503 Multivariate Analysis of Social Data
The general linear model and multivariate analysis, including dummy variable analysis, multiple covariance, multivariate analysis of variance, and factor analysis.
Prerequisite: SOC 502 or permission of instructor
3 credits

SOC 505, 506 Sociological Theory
A review of the intellectual development of the discipline, its epistemological foundations, current major theoretical orientations, and newly developing perspectives.
3 credits each semester

SOC 508 Experimental Methods
The design, conduct, analysis of laboratory and field experiments.
3 credits

SOC 509 Field Work
Practicum in field interviews and observations; problems of rapport, reliability and validity.
3 credits

SOC 511 Population Analysis
A survey of demographic theory and research. Determinants and consequences of population size, growth rates, composition and spatial distribution, family formation, fertility, mortality, and migration.
Prerequisite: One course in statistics
3 credits

SOC 513 The Metropolitan Community
Determinants and consequences of the growth of urban settlements. Their demographic composition and spatial structure. Problems in metropolitan community organization.
3 credits

SOC 514 Sociological Methods
An introduction to the logic of research and data analysis. Emphasis on concepts of association, elementary causal analysis, sampling, and problems of measurement. Applications to the interpretation of data encountered in the school curriculum and the mass media.
4 credits

SOC 521 Social Interactions
The study of interaction in formal and informal settings. The reciprocal influence among group structure, norms, and interactive processes. A prior course in social psychology is assumed.
3 credits

SOC 522 Socialization and the Self
Socialization as a continuous process throughout the life-cycle. Social and cultural sources of identity. Self-other systems as a form of social control. A prior course in social psychology is assumed.
3 credits

SOC 523 Sociology of Education
Relationships 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 (consult Continuing Education bulletin) 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 illness; the socialization of health practitioners; the social organization of hospitals, clinics and other facilities.
3 credits

SOC 580/581 Practicum in Applied Sociology
Sociological inquiry into aspects of American life and social problems, with emphasis on evaluation studies and policy planning in education, race relations, mass communications, deviance, environment and community issues. During the spring semester students design a teaching unit or a research project on a topic of their own choice.
4 credits

SOC 590 Independent Study
Intensive reading, under supervision of one or more instructors, of material not covered in the formal curriculum.
Variable and repetitive credit

SOC 591, 595 Special Seminars
Topics to be arranged. The seminar will be built around actual research activities of students and faculty. The following topics have been covered: Microsociology; Advanced Topics in Marxist Theory; Sociology of Emotions; Historical Methods; Ethnic Relations; Biosociology; Comparative Stratification; Max Weber; Science of

Sociology and Everyday Life; Methods of Behavioral Observation; Social Structure; Sociology of the Family.
1-3 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 and 503
3 credits

SOC 604 Advanced Topics in Qualitative Analysis
The use of personal documents, official records, field observations and interviews.
3 credits

SOC 606 Sociological Theory Construction
Modes of conceptualization and theory construction. Problems in developing a theory.
Prerequisite: 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.
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 692
Spring, 3 credits

SOC 698 Dissertation Research
Variable and repetitive credit

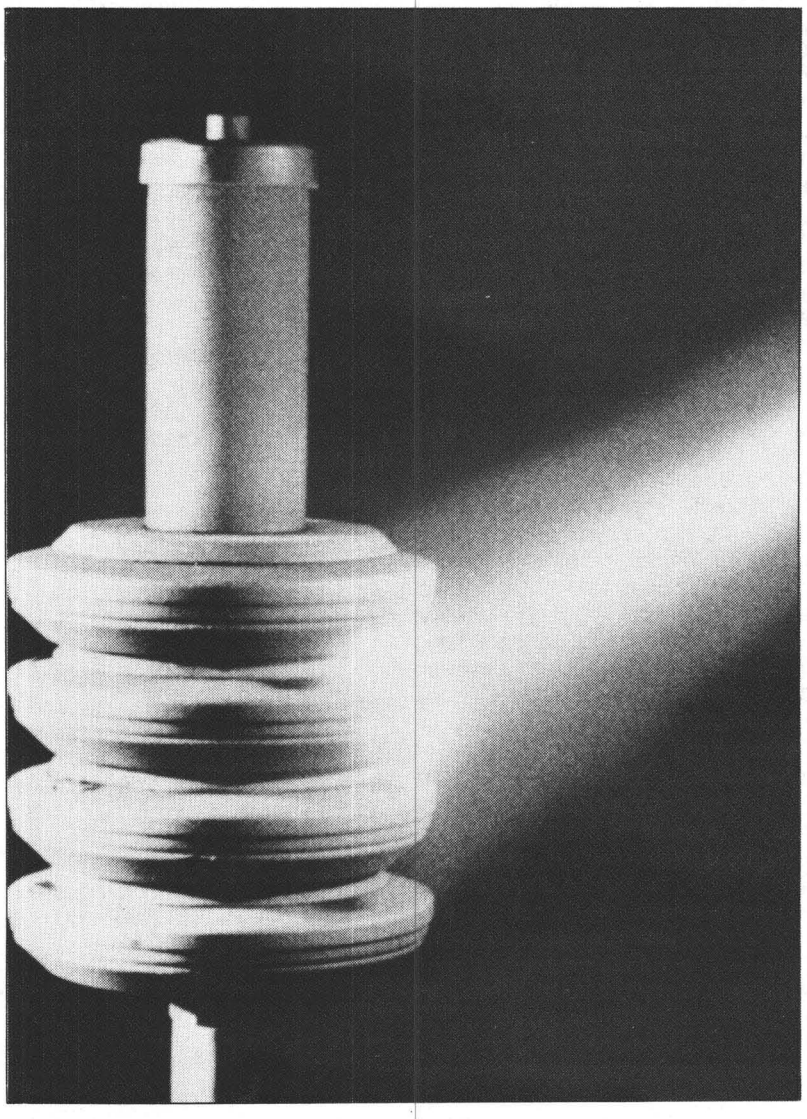
College of Engineering and Applied Sciences

Dean Stewart Harris
Old Engineering 100 (516)632-8380

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 department 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 academic department 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 Studies Director of the appropriate department.



Applied Mathematics and Statistics (AMS)

Chairperson: Alan Tucker
Mathematics Building P-139 (516)632-8360

Graduate Studies Director: Ram P. Srivastav
Mathematics Building P-137 (516)632-8360

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 (GRE) 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 Studies 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 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 Graduate Studies Director 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 529/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 Graduate Studies Director.

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 Graduate Studies Director.

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 Arthur Gilmore, Department of Technology and Society, SUNY at Stony Brook, Stony Brook, NY 11794-2250.

Faculty

Amir, Rabah, Assistant Professor. Ph.D., 1985, University of Illinois: Game theory; control theory.

Badr, Hussein G., Assistant Professor.[10] Ph.D., 1980, Pennsylvania State University: Operating system; computer system performance evaluation.

Balinski, Michel, Professor. Ph.D., 1959, Princeton University: Operations research.

Baxter, Laurence, Associate 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, Hung, Assistant Professor. Ph.D., 1984, University of California, Berkeley: Statistics; statistical computation.

Chen, Yung Ming, Professor. Ph.D, 1963, New York University: Numerical analysis and methods; numerical methods for solving inverse problems; large scale numerical simulations.

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.

Dubey, Pradeep, Professor. Ph.D., 1975, Cornell University: Game theory; mathematical economics.

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.

Goldstein, Charles I., Professor.[11] Ph.D., New York University: Numerical methods for solving partial differential equations.

Grimson, Roger, Associate Professor.[6] Ph.D., 1969, Duke University: Biostatistics, combinatorics, epidemiologic methods; nonparametric methods, mathematical modeling.

Ip, Chi Min, Visiting Assistant Professor. Ph.D., 1985, Cornell University: Operation research; mathematical programming.

Hagstrom, Thomas, Assistant Professor. Ph.D., 1983, California Institute of Technology: Numerical solutions of partial differential equations.

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.

Kim, Woo Jong, Professor. Ph.D., 1964, Carnegie Institute of Technology, Ph.D., 1968, Carnegie-Mellon University: Ordinary differential equations; oscillation, disconjugacy and monotonicity of solutions.

Liu, Hung Kung, Assistant Professor. Ph.D., 1984, Cornell University: Statistics; decision theory.

Mendell, Nancy, Associate Professor. Ph.D., 1972, University of North Carolina, Chapel Hill: Biostatistics.

Neyman, Abraham, Professor. Ph.D., 1977, Hebrew University: Game theory; mathematical economics.

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.

Rosenthal, Robert, Professor.[4] Ph.D., 1971, Stanford University: Game theory; mathematical economics.

Sexton, Thomas, Assistant Professor.[5] Ph.D., 1979, State University of New York at Stony Brook: Operations research, transportation problem analysis.

Sobel, Matthew, Professor.[5] Ph.D., 1965, Stanford University: Stochastic models, game theory, production management.

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.

Srivastav, Ram P., Professor and Graduate Studies Director. Ph.D., 1958, Lucknow University, India; Ph.D., 1963, D.Sc., 1972, Glasgow University, Scotland; 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., Professor. 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.

Zemanian, Armen H., Professor.[3] Eng. Sc.D., 1953, New York University: Network theory; food system modeling.

Zhang, Cunhui, Assistant Professor. Ph.D., 1984, Columbia University: Mathematical statistics; renewal theory.

Number of teaching, graduate, and research assistants, fall 1985: 40

[1] *Department of Ecology and Evolution*
[2] *Department of Mathematics*
[3] *Joint appointment with Department of Electrical Engineering*
[4] *Joint appointment with Department of Economics*
[5] *W. Averell Harriman College for Policy Analysis and Public Management*
[6] *Department of Community and Preventive Medicine*
[7] *Department of Ecology and Evolution*
[8] *Department of Sociology*
[9] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1973-74*
[10] *Department of Computer Science*
[11] *Brookhaven National Laboratory.*

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 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 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 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.
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: AMS 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: 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: AMS 543 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 model-

ing 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 non-cooperative 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.
Prerequisite: 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 non-linear 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 multivariate 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.
Prerequisite: AMS 572 or equivalent
3 credits

AMS 584 Sequential Methods
Sequential decision problems in statistics. 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. 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.
Prerequisite: 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 integration; 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 Modeling

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

3 credits, repetitive

AMS 698 Practicum in Teaching
3 credits, repetitive

AMS 699 Dissertation Research
Variable and repetitive credit

Computer Science (CSE)

Chairperson: Arthur Bernstein
Lab Office Building 1400 (516)632-8470

Graduate Studies Director: Peter Henderson
Lab Office Building 1400 (516)632-8462

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 working on 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 from the Department of Computer Science Graduate Student Handbook.

Facilities

Present departmental facilities include eight VAXs, a Pyramid 90x, three Symbolics lisp machines, and 39 SUN workstations all on an ethernet under 4.2bsd UNIX. This equipment is used primarily for departmental research in VLSI, databases, operating systems, programming environments, artificial intelligence, and graphics. Supporting peripherals and equipment include, among others, three laser printers and a color printer, four high-definition color graphics systems and numerous terminals and line printers. 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 IBM 3081 and VAX 8600 systems with approximately 200 terminals available to students.

Admission and Degree Requirements

The Department of Computer Science continually revises the admission and degree requirements for both the M.S. and Ph.D. degrees. For specific information regarding degree requirements please request the Graduate Student Handbook from the department.

The minimal requirements for admission to graduate study in computer science are listed below. Exceptionally talented students from other backgrounds or lacking certain requirements may be considered for admission by making up their deficiencies in preparation. Such students should consult with the Graduate Studies Director for advice and guidance.

A. Baccalaureate degree in a physical science, biological science, computer science, mathematics or engineering.

B. Two semesters of college level calculus, plus a course in linear algebra.

C. A year of a college level natural science (preferably physics).

D. College level courses in computer science covering:

1. Fundamental computer science concepts (e.g., algorithms, stepwise refinement, recursion, algorithm complexity and correctness, basic data structures, data processing, parameter passing, etc.)
2. Software development in a high-level language, preferably PASCAL or another structured language
3. Computer organization (e.g., CPU, memory, input/output, data representation, machine instructions, virtual memory, assembly languages, macros, linking and loading, machine architecture, micro-computers, etc.)
4. Software development in assembly language
5. Data structures (e.g., tree, linked list, graph structures, recursive structures, records, list structures, B-trees, etc.)
6. Advanced software development techniques (e.g., recursive algorithms, data abstractions, including stacks and queues, information hiding, modules and modular decomposition, software testing, advanced sorting and searching techniques, etc.)

E. A grade average of at least B (i.e., 3.0-4.0) in all undergraduate course work and in science, mathematics, and engineering courses.

F. Acceptance by the Computer Science Department and Graduate School.

G. All applicants to the graduate program must submit Graduate Record Examination (GRE) scores for the general aptitude tests. Applicants are encouraged to

submit GRE test scores for the advanced examination in their undergraduate major field as well.

In addition to the above requirements, it is recommended that students seeking admission to the graduate program have completed undergraduate computer science courses in automata theory, operating systems, and compilers.

Whatever the area of undergraduate specialization, students offering additional preparation in computer science (computer organization, systems programming, digital logic and systems), or mathematics (probability and statistics, logic, finite mathematics, modern algebra, numerical analysis) can expect more favorable consideration. It is highly recommended that students include courses in digital systems, finite mathematics, and modern algebra as part of their undergraduate preparation. Ph.D. bound students, in particular, will be handicapped without preparation in these areas of computer science and mathematics.

Students of exceptional promise who are deficient in preparation will be considered for admission to the program on a provisional basis. Prior to entrance the student will be informed of the requirements that must be satisfied for the termination of the provisional status.

The department is able to accept only a very limited number of applicants for spring admission to the program. Most such applications are deferred for consideration for the following fall semester. Students should be aware of this likelihood and withhold their application if they cannot accept the procedure.

Faculty

Badr, Hussein G., Assistant Professor. Ph.D., 1980, Pennsylvania State University: Operating systems; computer systems performance evaluation.

Bernstein, Arthur, Professor and Chairperson. 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.

Giacalone, Alessandro, Assistant Professor. Ph.D., 1984, Brown University: Programming languages; programming environments.

Henderson, Peter, Associate Professor and Graduate Studies Director. Ph.D., 1975, Princeton University: Software engineering; programming environments; computer science education.

Heller, Jack, Professor. Ph.D., 1950, Polytechnic Institute of Brooklyn: Database systems; office automation; programming environments.

Hsiang, Jieh, Assistant Professor. Ph.D., 1982, University of Illinois, Urbana-Champaign: Theory of computation; program verification; programming language semantics.

Kifer, Michael, Assistant Professor. Ph.D., 1984, Hebrew University of Jerusalem: Database systems; deductive databases; artificial intelligence.

Leahy, Grace, Lecturer. M.S., 1978, Syracuse University: Artificial intelligence; automated theorem proving; undergraduate education.

Lingle, David, Lecturer. M.S., 1986, State University of New York at Stony Brook: Logic programming; automated theorem proving.

Mishra, Prateek, Assistant Professor. Ph.D., 1984, University of Utah: Declarative languages; programming language semantics.

Pawagi, Shaunak, Assistant Professor. Ph.D., 1986, University of Maryland: Parallel processing; systems architecture.

Ramakrishnan, I.V., Assistant Professor. Ph.D., 1983, University of Texas at Austin: Computer architecture; parallel algorithms; fault-tolerant computing.

Smith, David, Professor. Ph.D., 1961, University of Wisconsin: VLSI; computer architecture; digital systems.

Smolka, Scott, Assistant Professor. Ph.D., 1984, Brown University: Semantics and complexity of communicating processes; design of distributed languages.

Srivas, M.K., Assistant Professor. Ph.D., 1983, Massachusetts Institute of Technology: Specification and verification of software and hardware systems; functional languages; program transformation.

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; logic programming.

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 1985: 65.

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 processor 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 505 Computing with Logic
The course will explore logic-based computing and logic programming. It includes an introduction to programming in logic, covering basic techniques for solving problems in a logic programming system. Particular attention will be paid to user interface issues and how a logic system can provide a useful computing environment. The course covers implementation issues, emphasizing how a logic programming system generalizes both traditional programming language systems and traditional database systems.
Prerequisites: Undergraduate courses in compilers and data structures
3 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 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 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 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 existing 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.
Prerequisite: Graduate student status or permission of instructor
3 credits

CSE 541 Theoretical Foundation 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). Non-classical logic systems useful in computer applications (temporal logic, dynamic logic, many-sorted logic, intuitionistic logic).
Prerequisite: CSE 303 or permission of 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 instructor
3 credits

CSE 545 Mechanical Inferences
Refutational and deductive theorem proving: resolution, paramodulation, and natural deduction systems. Techniques for proving partial correctness and termination of programs. Inductive theorem proving. Term rewriting systems. Deductive synthesis of programs.
Prerequisite: CSE 541 or consent of 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 549 Formal Foundations for VLSI Design
A study of the algorithms related to VLSI design. Among topics covered: area/time tradeoffs, layout algorithms, networks of processors, systolic algorithms.
Prerequisites: CSE 503, CSE 548, or permission of instructor
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. Prior permission of the Graduate Studies 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 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: Stephen D. Shapiro
Light Engineering Building 273 (516)632-8420

Graduate Studies Director: Jayant P. Parekh
Light Engineering Building 225 (516)632-8399

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. The department has graduate level teaching and research laboratories in microprocessors, digital signal processing, robotics, microwave electronics and telecommunications. The department has unusually sophisticated computing facilities.

Areas of Emphasis in Graduate Study

Particular areas of emphasis in current research and instruction in the graduate programs of the department are signal processing, pattern recognition, artificial intelligence, robotics, 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 microwave electronics. Theoretical and experimental programs reflecting these areas are currently operative and students are encouraged to participate actively 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 their respective 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: ECO 510-511, ECO 520-521, SOC 502, SOC 503, SOC 505, SOC 514.

Communications and Information Science

The predicted growth pattern of communications and information processing remains explosive for the foreseeable future. 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, artificial intelligence, computer organization, performance evaluation, computing system design and pattern recognition and on both theoretical and practical problems associated with the design and development. The department has a large number of powerful computers. The Departments of Electrical Engineering and Computer Science 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, Microwave and Quantum Electronics

The program of courses and research ranges from the basics of semiconductor and quantum physics to state-of-the-art microwave devices. Important areas of research include high-power millimeter wave Gunn oscillators and the emerging microwave analog signal processing technology employing magnetostatic waves in epitaxial films of yttrium iron garnet (YIG). The course offerings pertinent to this are: ESE 510, ESE 511, ESE 512, ESE 514, ESE 515, ESE 516-517, ESE 518, ESE 520-524, ESE 560-561, ESE 610.

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* is the general departmental computing facility equipped with AT&T 3B20, VAX 11/780, three AT&T 3B5s, 25 AT&T 3B2 supermicrocomputers, 25 AT&T 5620 graphics terminals, 50 AT&T 5425s and many other terminals and PC's, ethernet and 3BNET local area networks. These systems include a full complement of peripherals.

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 excellent 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 Microwave Electronics Laboratory* is equipped for experimental work in the fabrication and testing of microwave components utilizing microstrip and stripline techniques. It includes low-temperature and electromagnet facilities, vacuum deposit equipment, photolithographic facilities, microwave equipments and a full range of microwave circuit components and a microwave network analyzer system. The laboratory is presently active in research in the area of magnetostatic waves in epitaxial films of yttrium iron garnet (YIG) and their application to microwave signal processing devices.

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 (GRE) 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 597, ESE 599, ESE 691, ESE 698 or ESE 699. All non-EE courses must receive *prior* approval from the Graduate Studies Director.

B. Minimum of eight 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 597, ESE 599, ESE 698 and ESE 699 are not counted as regular courses in B. ESE 670 may not be counted more than twice (maximum of six 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 six credits for ESE 599. No more than 12 credits total may be taken from ESE 506, ESE 507, ESE 597, ESE 599, or ESE 698. All non-EE courses must receive prior approval from the Graduate Studies Director.

B. Minimum of six 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 597, ESE 599, ESE 698 and ESE 699 are not counted as regular courses in B. ESE 670 may not be counted more than twice (maximum of six 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 14 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.

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.

Chen, Chi-Tsong, Professor. Ph.D., 1966, University of California, Berkeley; CA systems and control theory; digital signal processing.

Dhadwal, Harbans, Assistant Professor. Ph.D., 1980, University of London, England: Laser light scattering, fiber optics, signal processing and instrumentation.

Don, Hon-Son, Assistant Professor. Ph.D., 1985, Purdue University: Image processing and pattern recognition.

Driscoll, Timothy J., Adjunct Associate Professor.[2] 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; robotics; circuits theory; theory of sensitivity; applied mathematics.

Hantgan, Jeffrey C., Assistant Professor. Ph.D., 1981, Cornell University: Linear network theory and electrophysics.

Marburger, John H., Professor and President, State University of New York at Stony Brook.[3] Ph.D., 1967, Stanford University: Theoretical laser physics.

Marks, Lloyd A., Assistant Professor.[4] M.D., University of Michigan: Biomedical instrumentation and signal processing.

Marsocci, Velio A., Professor.[5] Eng. Sc.D., 1964, New York University: Solid-state electronics, integrated electronics; biomedical engineering.

Murray, John, Associate Professor. Ph.D., 1974, University of Notre Dame: Systems, controls and instrumentation.

Parekh, Jayant P., Professor and Graduate Studies Director. Ph.D., 1971, Polytechnic Institute of Brooklyn: Microwave acoustics; microwave magnetics; microwave electronics; microcomputer applications.

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.[1] Ph.D., 1965, New York University: Communication theory; systems.

Robertazzi, Thomas G., Assistant Professor. Ph.D., 1981, Princeton University: Computer communications, statistics, and combinational optimization.

Shapiro, Stephen D., Professor and Chairperson. Ph.D., 1967, Columbia University: Digital systems and picture processing.

Short, Kenneth L., Associate Professor.[6] Ph.D., 1973, State University of New York at Stony Brook: Digital system design, microprocessors; instrumentation.

Smith, David R., Professor.[7] 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.

Swartz, Jerome, Adjunct Professor.[8] Ph.D., 1968, Polytechnic Institute of New York: Signal processing and laser technology.

Truxal, John G., Distinguished Teaching Professor.[9] 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, City College of City University of New York: Communications, communication systems, digital systems, digital processing.

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; computational methods; geophysical modeling.

Number of teaching, graduate and research assistants, fall 1985: 40

[1] *Joint appointment, Department of Materials Science and Engineering*
[2] *Long Island Lighting Company*
[3] *Joint appointment, Department of Physics*
[4] *Joint appointment, Department of Pediatrics*
[5] *Clinical Professor of Health Science*
[6] *Chancellor's Award for Excellence in Teaching 1985*
[7] *Joint appointment, Department of Computer Science*
[8] *Symbol Technologies*
[9] *Full-time appointment with Department of Technology and Society.*

Courses

ESE 501 Graduate Laboratory in Electrical Sciences
Intended to familiarize the student with the use of research laboratory equipment, basic measurement techniques and integration into an overall experimental project. Each student will select at least three experimental projects from the following areas to be supervised by the faculty: applied optics, microwave electronics, wave propagation and solid-state electronics. The student must set up the experimental system, measure the necessary parameters and perform the required experiments in order to complete the project.
Fall, 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.
Fall, 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 densities and transmission properties. Optimum linear filtering, estimation and prediction.
Fall, 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
Spring, 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 Studies Director
Fall, spring, 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.
Fall, 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.
Fall, 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.
Spring, 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
Fall, 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.
Fall, 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.
Fall, spring, 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.
Spring, 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.
Spring, 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.
Fall, 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.
Spring, 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.
Fall, 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, IM CON 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
Fall, 3 credits

ESE 525 Electromagnetic Methods in Geophysical Exploration
The theory and methods of exploring the structure of the earth and searching for oil and mineral resources by using electric, electromagnetic, and magnetotelluric techniques: resistivity methods, electromagnetic induction, magnetotelluric principles, electromagnetic transients, induced polarization, sounding techniques, well-logging, computational problems, inverse problems.
Prerequisite or corequisite: ESE 520 or equivalent
Fall, 3 credits

ESE 526 Introduction to Integrated Circuits Technology
This course introduces the basic technologies employed to fabricate advanced integrated circuits. These include epitaxy, diffusion, oxidation, chemical vapor deposition, ion implantation lithography and etching. The significance of the variation of these steps is discussed with respect to its effect on device performance. The electrical and the geometric design rules are examined together with the integration of these fabrication techniques to reveal the relationship between circuit design and the fabrication process.
Prerequisite: ESE 514
Fall, 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.
Spring, 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
Spring, 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
Spring, 3 credits

ESE 532 Theory of Digital Communication II
The channel capacity theorem, bounds on optimum system performance, encoding for error reduction, the fading channel, communications with feedback, telemetry, factors in design of multiplexed and repeated transmission systems.
Prerequisite: ESE 531
Fall, 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 access, PSK, carrier-phase tracking, filter distortion, bit sync, timing systems, delay-lock tracking.
Prerequisite: ESE 503 or equivalent
Spring, 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.
Fall, 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.
Spring, 3 credits

ESE 541 Discrete Time Systems
Analysis and synthesis of discrete time systems and discrete time-controlled continuous systems. Topics include Z-transform and state variable representations of discrete time systems, controllability and observability. Stability criterion. Synthesis methods. Dynamite programming and optimum control. Sampled spectral densities and correlation sequence. Optimum filtering and control of random processes.
Prerequisite: ESE 502
Spring, 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.
Spring, 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.
Fall, 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.
Spring, 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
Spring, 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.
Spring, 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.
Fall, 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
Spring, 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
Fall, 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
Spring, 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 a scalable set of design rules. Also examined are the effects of scaling down the dimensions of devices and systems, as will occur with future improvements in fabrication technology.
Prerequisite: B.S. in electrical engineering or computer science
Fall, 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
Spring, 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.
Spring, 3 credits

ESE 557 Digital 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
Spring, 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, electro-optical 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 equalization, deblurring, weiner filtering, and pseudo-inverse restoration.
Prerequisite: Linear Systems/Problem Theory
Fall, 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
Spring, 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
Fall, spring, 3 credits each semester

ESE 563 Fundamentals of Robotics I
This course covers: homogenous transformations of coordinates; kinematic and dynamic equations of robots with their associated solutions; control and programming of robots.
Prerequisite: Permission of instructor
Fall, 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 trajectory plannings.
Prerequisite: Permission of instructor
Spring, 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.
Fall, 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.
Spring, 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.
Fall, 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.
Fall, spring, 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.
Fall, spring, 4 credits, each semester

ESE 585 Applications of Artificial Intelligence to Signal Processing
Principles of artificial intelligence with applications to signal processing and robotics; topics include stochastic pattern recognition, decision functions, mathematical programming, predicate calculus, and applications of expert systems.
Prerequisite: ESE 503
3 credits

ESE 596 Internship in Bioengineering
Student will work with physicians in hospital or other clinical facility, and will gain experience in clinical instrumentation diagnosis and in treatment of diseases.
Prerequisite: Physiology background
Fall and spring, 3 credits, repetitive

ESE 597 Practicum in Engineering
Discussion and 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 Studies Director. The grade will be assigned, and credit granted, upon submission of a written report or seminar presentation of the work performed.
Fall and spring, variable and repetitive credit

ESE 599 Research
Fall and spring, 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.
Fall and spring, 3 credits

ESE 630 Seminar in Communication Theory
Fall and spring, 3 credits

ESE 640 Seminar in Systems Theory
Recent and current research work in systems theory.
Fall and spring, 3 credits

ESE 650 Advanced Topics in Digital Systems
Topics of special interest in the area of digital systems.
Fall and spring, 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
Fall and spring, 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. Topics include: 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 and Lasers; o) Communication Theory; p) Wave Propagation; q) Integrated Optics; r) Optical Communications and Information Processing; s) Instrumentation; t) VLSI Computer Design and Processing.
Fall and spring, 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.
Fall and spring, 1 credit, repetitive, grading S,U

ESE 698 Practicum in Teaching
Fall and spring, variable and repetitive credit, grading S, U

ESE 699 Dissertation Research
Fall and spring, variable and repetitive credit, grading S, U

Materials Science and Engineering

(ESM)

Chairperson: S. Michael Ohr
Engineering Building 314 (516)632-8484

Graduate Studies Director: A.H. King
Engineering Building 316 (516)632-8497

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 new, advanced 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.

A multidisciplinary surface science and technology 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.

There is a wide variety of research in the field of surface science and engineering, ranging from fundamental studies of surface crystal structure using low energy electrons to the protection afforded to industrial materials through the use of surface modification techniques and the formation of protective coatings.

Advanced surface analysis instrumentation is available for studies of surface chemistry and structure. The fundamental nature as well as the engineering features of corrosion behavior are examined, together with means for controlling corrosion through alloying and surface protection approaches. Thermal spraying is used to apply a variety of protective coatings, ranging from light metals to high temperature oxides: the thermal spray laboratory is one of the most comprehensively equipped of its kind.

Many of the department's programs are carried out cooperatively with workers at Brookhaven National Laboratory (BNL), a modern research facility situated nearby.

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 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.

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 (GRE) 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 "Requirements for the Ph.D. Degree" 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 Studies 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 Studies 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 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.

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: Synchrotron topography; thin films and interface stability; mechanical properties; fracture, refractory metals.

Broughton, Jeremy Q., Assistant Professor. Ph.D., 1977, Cambridge University, England: Molecular dynamics; computer simulation; electronic materials.

Carleton, Herbert R., Professor.[1] Ph.D., 1964, Cornell University: Optical and ultrasonic properties; Computer simulation; surface acoustics.

Chu, Benjamin, Professor.[3] 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. Ph.D., 1976, Surrey University, England: Corrosion science; XPS; AES; RHEED; surface engineering.

Dudley, Michael, Assistant Professor. Ph.D., 1982, Warwick University, England: Single crystal plastic deformation in metals; solid state reactivity in organic, inorganic single crystals; synchrotron X-ray topography.

Goland, Allen N., Adjunct Professor.[2] Ph.D., 1956, Northwestern University; Solid-state physics; defects; interaction of radiation with condensed matter.

Herley, Patrick J., Professor.[3] Ph.D., 1960, Rhodes University, South Africa; Ph.D., D.I.C., 1964, D.Sc., 1982, 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: Metallurgical and ceramic protective coatings; surface modification.

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., Associate Professor and Graduate Studies Director. D. Phil., 1979, Oxford University, England: Electron microscopy; crystal defects; interfaces.

Levine, Sumner N., Professor. Ph.D., 1949, University of Wisconsin: Biomedical materials; electronic materials.

Ohr, S. Michael, Professor and Chairperson. Ph.D., 1963, Columbia University: Electron microscopy; crack tip phenomena.

Prewitt, Charles T., Professor.[4] Ph.D., 1962, Massachusetts Institute of Technology: Crystallography; solid state chemistry; mineralogy.

Pugh, James W., Adjunct Professor.[5] Ph.D., 1972, Massachusetts Institute of Technology: Biomedical engineering; polymers.

Seigle, Leslie L., Professor. D. Sc., 1951, Massachusetts Institute of Technology: Thermodynamics of solids, diffusion in solids; protective coatings; sintering.

Suenaga, Masaki, Adjunct Professor.[2] Ph.D., 1969, University of California, Berkeley: Metallurgy of superconducting materials.

Wang, Franklin F. Y., Professor. Ph.D., 1956, University of Illinois: Ceramics; electronic materials manufacturing processing; solar energy technology.

Warren, John B., Adjunct Assistant Professor.[2] Ph.D., 1978, University of Florida: Analytical electron microscopy; X-ray fluorescence; semiconductor defects.

Welch, David O., Adjunct Professor.[2] 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 1985: 34.

[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*
[5] *Joint appointment, Department of Orthopaedic Surgery, School of Medicine*

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, stereographic projection and crystal orientation determination; concept of reciprocal vector space. Laboratory work in X-ray diffraction is also included.
Fall, 3 credits

ESM 506 Mechanical Properties of Engineering Materials
A unified approach for all solid materials will be made with regard to the correlation between microstructure and their macroscopic mechanical properties. The course deals with various testing techniques for delineating mechanical properties of materials, considering elasticity, anelasticity, plasticity, dislocation theory, cohesive strength, fracture and surface wear. Attention is given to strengthening mechanisms for solids, metals, ceramics and polymers.
Fall, 3 credits

ESM 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 515 Phase Transformations
A review of the processes by which structures are changed in the solid state. Classical nucleation theory including homogeneous and heterogeneous mechanics. Diffusional and diffusionless growth mechanisms. Transformation kinetics.
Prerequisite: ESG 332
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 diffusion plays an important role is considered, such as ionic conduction, oxidation of metals, and the sintering of solids.
Spring, 3 credits

ESM 615 Seminar in Phase Transformations
The theory of phase transformations in solids is considered. Kinetics and 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 faculty 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

Graduate Studies Director: Sultan Hameed
Light Engineering Building 169 (516)632-8319

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, combustion 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.

Mechanical Design

Several areas of research in Mechanical Design are pursued in the department. Research programs in the area of Mechanisms Design involve the determination of the characteristics and performance criteria of high speed mechanisms and spatial mechanisms using kinematic theory. Dynamics and design optimization of these mechanisms are also investigated. In Design Automation, most projects have been in the area of creative design of mechanisms through partially automated procedures. This concerns automatic generation of the "family tree" or the creation of related mechanisms for a given original mechanism and subsequently, the development of a systematic screening algorithm for functional analysis to search for feasible or optimum mechanisms. In the Computer-Aided Design (CAD) area, which involves Design Optimization, Computer Graphics and Computer Codes Applications, the curriculum is a cooperative teaching and learning experience with industry. Applied courses involving case studies, finite-element methods and computer graphics are taught and among them some are offered at the Grumman Aerospace Corporation by practicing engineers.

The Department has a modern CAD laboratory for undergraduate instruction as well as graduate research. The central processor is a VAX 8600 with peripherals which include interactive graphics terminals and plotters. State-of-the-art CAD and finite element software packages are available.

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; particularly, 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. Numerical calculations are carried out in the Atmospheric Sciences Computing Facility which houses a VAX 750, an IBM PC, printers and a plotter.

Admission

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 (GRE) 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 GRE 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 30 credits, exclusive of ESC 698 Practicum in Teaching, is required for the M.S. degree.

A. Course Requirements

1. *M.S. with thesis:* 21 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:* 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 Studies Director may waive this requirement if the student has taken an equivalent course elsewhere.
4. ESC 565 Departmental Research Seminar is mandatory for all first year graduate students.

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 12 credits (including transferred credits, if any) from other departments, can be approved at the discretion of the Graduate Studies 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 ESC 440. For the fifth year of the B.E./M.S. Program, students are required to register for 24 credits, of which 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 Studies Director approves 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 four areas within the department:

1. Energy Systems and Fluid Mechanics
2. Solid Mechanics
3. Atmospheric Sciences
4. Design

A minor from one of the following academic disciplines must also be selected:

1. Fluid Mechanics
2. Heat Transfer
3. Combustion and Propulsion
4. Statistical Mechanics
5. Solid Mechanics
6. Atmospheric Sciences
7. Design
8. 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 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 Studies 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 30 graduate credits. Only under extraordinary conditions, and by a written petition to the Graduate Studies 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. Statistical Mechanics
4. Combustion and Propulsion

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 coursework 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 Studies 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) copy 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.

Currie, Robert G., Research Associate Professor. Ph.D., 1965, University of California, Los Angeles: Atmospheric sciences.

Drubka, Robert, Assistant Professor. Ph.D., 1981, Illinois Institute of Technology: Experimental fluid mechanics.

Fox, Jane L., Assistant Professor. Ph.D., 1978, Harvard University: Planetary aeronomy.

Hameed, Sultan, Professor and Graduate Studies 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.

Karni, Jakov, Assistant Professor. Ph.D., 1984, University of Minnesota: Convective heat transfer.

Lee, Richard S.L., Professor. Ph.D., 1960, Harvard University: Fluid mechanics; fire research; suspension flow, flow instability, biomedical fluid flow.

Mayourian, Moez, Assistant Professor. Ph.D., 1985, Columbia University: Mechanisms design.

O'Brien, Edward E., Professor and Chairperson. Ph.D., 1960, The 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. Ph.D., 1965, University of California, Berkeley: Engine thermodynamics.

Yan, Hong-Sen, Associate Professor. Ph.D., 1980, Purdue University: Machine design; CAD.

Yang, Ching H., Professor. Ph.D., 1951, Lehigh University: Thermokinetic systems.

Number of teaching, graduate and research assistantships, fall 1985: 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 503 Computation of Fluid Flow and Heat Transfer
An introduction to a general purpose computation method for numerical solution of problems in heat transfer, fluid flow, and related processes.
Prerequisites: ESC 501, 502, 511, 512
Fall, alternate years, 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.
Spring, alternate years, 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.
Fall, 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.
Spring, 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.
Spring, 3 credits

ESC 521 Thermodynamics of Energy Systems
First law and second law. A rigorous examination of the concept of equilibrium and the nature of processes toward equilibrium. Reversible process and available energy. Carnot engine and the thermal equilibrium. Van't Hoff reaction box and the chemical equilibrium. Irreversible processes such as mixing and combustion. Applications to energy systems of interest to mechanical engineers.
Fall, alternate years, 3 credits

ESC 522 Combustion Theory I
Explosions and explosion theories. Premixed, diffusion and turbulent flames. Detonations in gases and condensed phases. Theories of extinction and detonability limits. Transitions between deflargration and detonation waves. Applications to internal combustion engine and jet and rocket propulsion.
Fall, alternate years, 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 shapes 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.
Spring, alternate years, 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: ESC 440
Fall, alternate years, 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
Fall, alternate years, 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.
Fall, 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.
Fall, 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. Principle 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.
Spring, 3 credits

ESC 537 Experimental Fluid Mechanics I: Measurement Techniques
Fundamentals 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.
Fall, 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.
Fall, 3 credits

ESC 539 Finite Element Methods in Structural Analyses
Theory of finite element methods and their application to structural analysis problems. Matrix operations, force and displacement methods. Derivation of matrices for bars, beams, shear panels, membranes, plates and solids. Use of these elements to model actual structural problems. Weighted residual techniques and extension of the finite element method into other areas such as heat flow and fluid flow. Laboratory sessions introduce use of the computer in solving finite element problems. Programs for the solution of force and displacement method problems are configured. A computer project consisting of the solution and evaluation of a structural problem is required.
Fall, 4 credits

ESC 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 credits each semester

ESC 543 Plasticity
Stress and deformation of solids: Yield criteria and flow rules for plasticity deforming solids; the notion of a stable inelastic material; static and dynamic analysis of plastic bodies under mechanical and thermal loadings; use of load bounding theorems and the calculation of collapse loads of structures; the theory of the slip-line field.
Spring, alternate years, 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 planets.
Fall, alternate years, 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.
Fall, alternate years, 3 credits

ESC 547 Planetary Aeronomy
This course will focus on the chemical and thermal structures of planetary atmospheres, especially upper atmospheres. We will discuss the ways that solar energy is absorbed and how it relates to the composition (both neutral and ionic), temperatures, and airglow features. We will also look into the escape of species from the top of the atmosphere and atmospheric evolution.
Prerequisite: Permission of instructor
Spring, alternate years, 3 credits

ESC 548 Air Pollution Meteorology
A discussion of atmospheric processes which determine air pollution concentration. Theory of diffusion with application to pollution dispersion from point, line and area sources. Practical methods for estimating pollution levels near urban and industrial sources. Chemical interactions of air pollutants. Production of ozone in urban smog. Urban heat-island. Modification of local weather by pollution.
Spring, alternate years, 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 atmospheric composition arising from natural and anthropogenic causes will also be covered.
Prerequisite: Permission of instructor
Spring, 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.
Spring, alternate years, 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.
Fall, 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
Fall, 0 credits

ESC 566 Kinematic Analysis of Mechanisms
Introduction; mechanism structure; basic concepts of mechanisms; canonical representation of motion. Kinematic analysis: graphical method; algebraic method; vector-loop method; complex number method; spherical and spatial polygon method; matrix method; dual number quaterion method; screw coordinate method; line coordinate method; motor algebra method. Computer-aided mechanisms analysis.
Fall, 3 credits

ESC 567 Kinematic Synthesis of Mechanisms
Introduction; type synthesis; number synthesis; coupler curves; curvature theory-path generation; finite displacement theory—rigid body guidance; function generation; computer-aided mechanisms synthesis.
Spring, 3 credits

ESC 571 Analysis and Design of Robotic Manipulators
Introduction to robot manipulators from mechanical viewpoint emphasizing mechanisms fundamentals and design considerations. Kinematics on 2-D and 3-D manipulators; statics and dynamics; motion planning; control funda-

mentals; algorithms development; computer-graphics simulation of manipulators; current applications.
Prerequisite: Permission of instructor
Fall, alternate years, 3 credits

ESC 591 Thermodynamics
The course will begin with a review of elementary thermodynamics and go on to consider more advanced areas of thermodynamic theory that are fundamental to various engineering applications, such as irreversible thermodynamics. Special topics will include thermophysical properties of fluids and the form of thermodynamic perturbation theory that has proven to be of enormous utility to chemical engineers.
Spring, alternate years, 3 credits

ESC 596 Mechanical Engineering Design Master's Project
Design project for master's students who are completing the program in Comuter-Aided Engineering Design. Project should include the processes of preliminary design analysis and systems synthesis.
Prerequisites: ESC 525, ESC 526
6 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.
Fall, alternate years, 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
Fall, alternate years, 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.
Fall, alternate years, 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.
Spring, alternate years, 3 credits

ESC 622 Combustion Theory II
Special topics in combustion and combustion kinetics: Engine knocking and cool flames, kinetic and thermal-kinetic oscillations, soot and carbon black formation, photo-chemical smog and kinetic processes in atmosphere, jet engine stability and rocket oscillations, coal combustion and gasification, and combustion safety in nuclear reactor environment.
Spring, alternate years, 3 credits

ESC 625 Turbulent Diffusion
Eulerian description of passive contaminants in homogeneous turbulence. Closure techniques and their flaws. Lagrangian description of single particle and relative diffusion. Similarity in shear flows. The role of buoyancy forces in atmospheric transport. An introduction to turbulent reactive flows.
3 credits

ESC 626 Rheological Heat Transfer
Consideration of the flow and heat transfer of rheological fluids in 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
Fall, 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.
Spring, alternate years, 3 credits

ESC 671 Optical Methods for Experimental Stress Analysis
Theory and applications of moire methods (in-plane, 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.
Spring, 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 spacecraft and ground-based observations. Student participation is encouraged. This course is identical to ESS 661.
Fall, alternate years, 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)632-8770

Graduate Studies Director: Thomas T. Liao
Engineering Building E-220 (516)632-8770

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 available for full-time students who qualify.

Graduate Studies in Industrial Management

The Department of Technology and Society administers a Graduate Studies in Industrial Management program for the College of Engineering and Applied Sciences. Satisfactory completion of the Industrial Management curriculum leads to a terminal M.S. degre.

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 admission requirements 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 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 and 12 networked IBM/PC workstations. The third laboratory houses at lease one of most of the other microcomputers (e.g., six 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 (GRE) 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. Five required courses (three 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 three 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.

Liao, T.T., Professor and Graduate Studies Director. 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.

Reaven, S.J., Assistant Professor. Ph.D., 1975, University of California, Berkeley: Science and technology policy, energy and environment problems and issues.

Spanier, S.W., Lecturer. Ph.D., Pennsylvania State University, 1981: Communication skills for engineering and applied sciences.

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.

Number of teaching, graduate and research assistants, fall 1985: 9

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.
Prerequisite/Corequisite: 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 broad selection of programs. A maximum of six credits of graduate coursework under the continuing education 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 response 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 506 Production and Operations Management
This course deals with the design, planning and organizing of resources to develop and manufacture new products or to bring new services on line. The factors affecting product and process design, project planning, facility location and layout, operations scheduling, job analysis, inventory control, material requirements planning and quality control will be identified and related through analytical and modeling techniques.
Summer, 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.
Spring, 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

COMPUTER 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 or permission of instructor
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 workload and credit(s).
Prerequisite: EST 590
Fall and spring, 1 to 3 credits

PLANNING AND MANAGEMENT ELECTIVES

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 computers as aids in decision making. A treatment will be given of the cognitive science and artificial intelligence 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

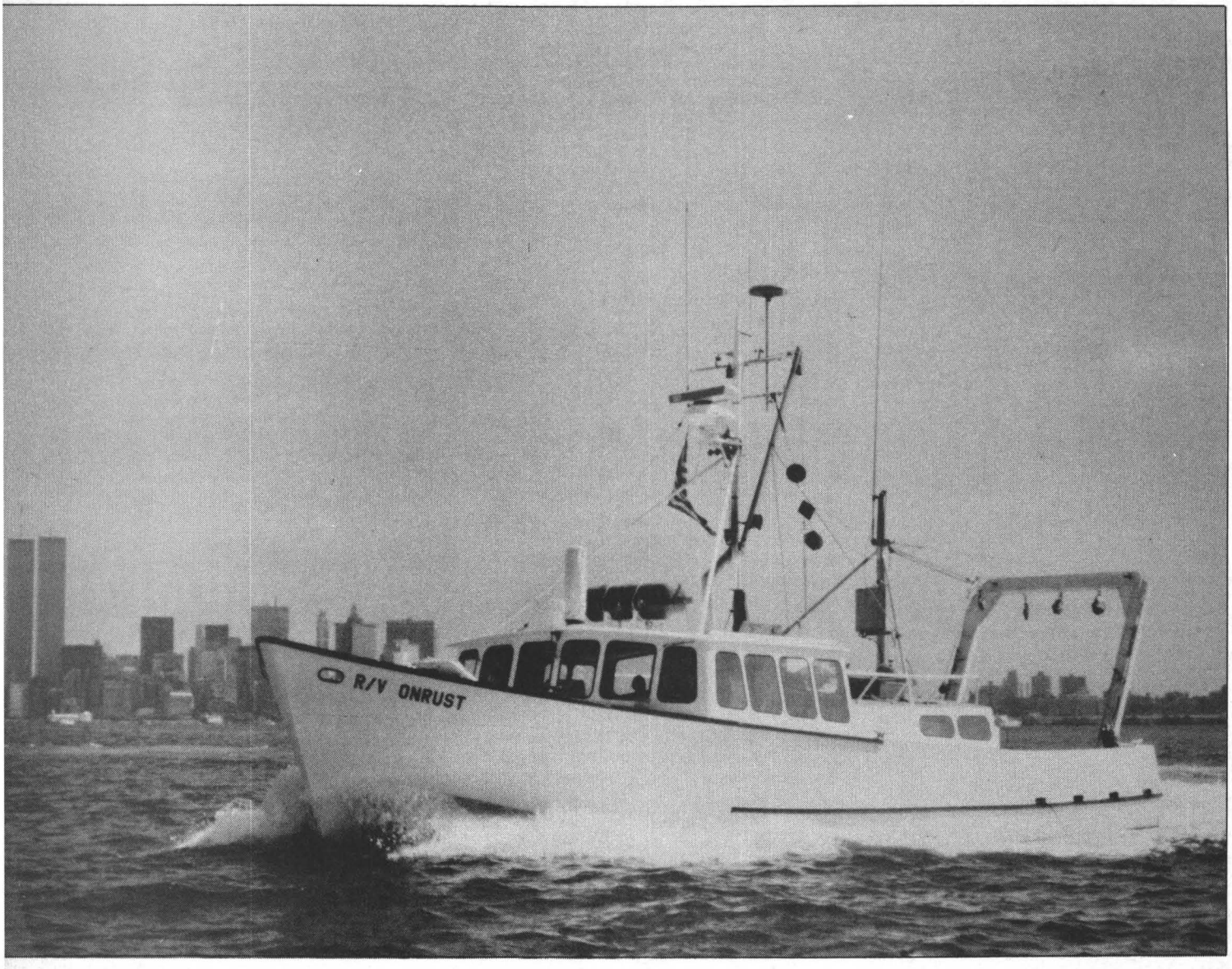
EMP 505 Investment and Portfolio Management
Provides an introduction to investments in stocks, bonds, options, commodities and the design of portfolios to realize optimal return on investment, at least risk. Topics include operations of the securities markets, evaluation of investments, trading strategies, timing, risk vs. return analysis, efficient market theory, capital market theory.
Prerequisite: EMP 502 or equivalent
3 credits

EMP 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 situation, role playing and experiential techniques.
3 credits

Marine Sciences Research Center

Dean: J.R. Schubel
Endeavour Hall 145 (516)632-8700

Graduate Studies Director: Glenn Lopez
Dana Hall 111



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, into solutions 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.

MSRC offers an M.S. degree in Marine Environmental Sciences and a Ph.D. degree in Coastal Oceanography. Following are detailed descriptions of the two programs. Interested students should address inquiries to the Graduate Studies Director.

The M.S. Program in Marine Environmental Sciences

The M.S. program offered by 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 students 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 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 Graduate Record Examination (GRE) General Test.

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 GRE General Test are 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 at least a B average; or demonstration of proficiency to the satisfaction of the instructor. 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. MAR 547 Oceanographic Problem Solving. All students must pass one semester of MAR 547. A maximum of two credits of MAR 547 can be counted toward the Graduate School's 30-credit requirement for the M.S. degree.

C. Seminar MAR 580 (two 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. A minimum of six credits in specialty courses (excluding MAR 501, 502, 503, 506, 547, 555 and 580) selected by the student and his or her advisor and approved by the advisor.

G. Sea experience or appropriate field experience.

H. Oral presentation 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:

A. Demonstrate proficiency in one approved foreign language.

B. Departmental examination.

C. Ph.D. degree dissertation proposal approved by three MSRC faculty.

D. Sea experience or appropriate field experience.

E. Seminar MAR 580 (two semesters).

F. An advisor by the end of the first year.

G. Practicum in teaching.

H. Oral qualifying examination.

I. Formal advancement to candidacy.

J. Oral defense of dissertation.

K. Submission of approved dissertation.

L. Residency. Normally at least two consecutive semesters of full-time study.

Faculty

Aller, Josephine Y., Assistant Research Professor. Ph.D., 1975, University of Southern California: Marine benthic ecology; invertebrate zoology; marine microbiology; biogeochemistry.

Aller, Robert C., Professor. Ph.D., 1977, Yale University: Marine geochemistry; marine animal-sediment relations.

Bokuniewicz, Henry J., Associate Professor. Ph.D., 1976, Yale University: Nearshore transport processes; coastal sedimentation; marine geophysics.

Bowman, M.J., Associate Professor. Ph.D., 1971, University of Saskatchewan, Canada: Coastal dynamics; oceanic fronts; productivity and physical processes.

Bricelj, V. Monica, Assistant Research Professor. Ph.D., 1984, State University of New York at Stony Brook: Physiological ecology; bioenergetics; shellfish (molluscan) biology.

Brinkhuis, Boudewijn H., Assistant Professor. Ph.D., 1975, State University of New York at Stony Brook: Primary productivity of phytoplankton and seaweeds; biogeochemistry of trace metals in marine plants; physiological ecology of marine organisms.

Capone, Douglas G., Assistant Professor. Ph.D., 1978, University of Miami: Marine microbial ecology; nitrogen cycling in marine systems.

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; effects of toxic chemicals and electric power stations on coastal plankton.

Carter, Harry H., Professor Emeritus. 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; recolonization.

Cochran, J. Kirk, Associate Professor. 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.

Cowen, Robert K., Assistant Professor. Ph.D., 1985, University of California, San Diego (Scripps): Fishery oceanography; nearshore fish populations; fish ecology.

Crawford, W.R., Adjunct Associate Professor. Ph.D., 1976, University of British Columbia, Vancouver: Continental shelf and slope dynamics microstructure; tidal dynamics.

Duerr, E.O., Adjunct Assistant Professor. Ph.D., 1981, University of Miami: Aquaculture of marine phytoplankton, particularly cyanobacteria.

Duguay, Linda E., Assistant Research Professor. Ph.D., 1979, University of Miami: Invertebrate zoology; protozoology; gelatinous zooplankton.

Esaias, W.E., Adjunct Associate Professor. Ph.D., 1973, Oregon State University: Phytoplankton ecology; photobiology.

Fairbridge, Rhodes W., Adjunct Professor. D. Sc. 1944, University of Western Australia: Geology; coastal geomorphology; sedimentology; ecology.

Falkowski, Paul G., Adjunct Assistant Professor. 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 Cruz: Seaweed ecology and physiology.

Giese, Graham S., 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.[1] Ph.D., 1961, Northwestern University: Ocean engineering: undersea vehicles; marine materials.

Horrigan, Sarah G., Assistant Professor. Ph.D., Scripps Institution of Oceanography: Marine microbial ecology; nutrient cycling.

Koehn, R.K., Professor.[2] Ph.D., 1967, Arizona State University: Genetics and physiological ecology of natural populations; especially of marine bivalves.

Koppelman, Lee E., Professor and Executive Director, Long Island Regional Planning Board. Ph.D., 1970, Cornell University: Coastal zone management; planning; policy studies.

Lee, Cindy, Associate Professor. Ph.D., 1975, University of California, San Diego (Scripps): Marine geochemistry of organic compounds; organic and inorganic nitrogen cycle biochemistry.

Lopez, Glenn R., Associate Professor and Graduate Studies Director. 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 sediments.

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.

McHugh, John L., Professor Emeritus. Ph.D., 1950, University of California, Los Angeles: Fishery management; fishery oceanography; whales and whaling.

Meyers, William J., Associate Professor.[3] Ph.D., 1973, Rice University: Carbonates; sedimentology.

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: Coastal zooplankton ecology; biological 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., Professor and Dean. 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 biogeochemistry; geochemistry of reduced gases; chemical cycling in anoxic systems.

Siddall, Scott E., Assistant Professor. Ph.D., 1980, University of Miami: Biology and ecology of molluscan larvae; shellfish mariculture.

Slobodkin, Lawrence B., Professor.[2] Ph.D., 1951, Yale University: Evolutionary strategy with reference to species diversity; timing of responses, self image adaptive mechanisms of Hydra.

Smith, Sharon L., Adjunct Assistant Professor. Ph.D., 1975, Duke University: Plankton ecology; nutrient regeneration by zooplankton.

Swanson, R. Lawrence, Adjunct Professor. Ph.D., 1971, Oregon State University: Physical oceanography of coastal waters and estuaries; ocean dumping; coastal zone management.

Taylor, L.J., Adjunct Assistant Professor. Ph.D., 1977, State University of New York at Stony Brook: Sociocultural aspects of fishing communities.

Terry, Orville W., Associate Research Professor. Ph.D., 1970, State University of New York at Stony Brook: Aquaculture, especially of seaweed; wetlands management.

Thomson, R.E., Adjunct Associate Professor. Ph.D., 1971, University of British Columbia: Coastal oceanography; continental shelf waves; slope currents.

Vaughn, James M., Adjunct Associate Professor. 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.

Wang, Dong-Ping, Professor. Ph.D., 1975, University of Miami: Coastal ocean dynamics.

Wang, Franklin F.Y., Professor.[1] 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.

Whitledge, Terry E., Adjunct Assistant Professor. 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 chlorinated hydrocarbons on phytoplankton communites.

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 1985: 68.

[1] *Joint appointment, Department of Materials Sciences and Engineering*
[2] *Joint appointment, Department of Ecology and Evolution*
[3] *Joint appointment, Department of Earth and Space Sciences*

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 broad treatment of energy and nutrient cycling in coastal and open ocean environments. Introduction to organisms and habitats. Includes a student lab project to develop research skills.
Prerequisite: Enrollment in Marine Environmental Sciences program or permission of instructor
Fall, 4 credits

MAR 503 Chemical Oceanography
Introduction to chemical oceanography. Topics include origin and history of seawater, major and minor constituents, dissolved gases, the carbon dioxide system, distribution of properties in the World Ocean, isotope geochemistry, estuarine and hydrothermal vent geochemistry.
Prerequisite: Enrollment in the Marine Environmental Sciences program or permission of instructor
Spring, 4 credits

MAR 506 Geological Oceanography
An introduction to the geological oceanography of the World Ocean with emphasis on the coastal environment; discussions of the physical processes controlling the structure and evolution of the ocean basins and continental margins, the distribution of marine sediment and the development of coastal features.
Prerequisite: 1 year physics, 1 year calculus, and permission of instructor
Spring, 4 credits

MAR 510 Modelling Techniques in Chemical Oceanography
Derivation of solutions to advection-diffusion-reaction equations for marine sediments and waters. One and multi-dimensional models are developed for dissolved and solid phase substances in cartesian, cylindrical and spherical coordinates. Effect of imposing multiple layers on these systems will be examined.
Prerequisite: Permission of instructor
Spring, 3 credits

MAR 512 Toxicants and Plankton
A seminar course in which each participant gives two seminars, then leads a discussion. Topics to include the toxicology of manmade and natural toxicants and toxins to plankton organisms.
Prerequisite: Enrollment in Marine Environmental Sciences or Coastal Oceanography program
Fall, 1 credit

MAR 513 Marine Biochemistry
Survey of biochemical features and adaptations characteristic of the marine biota. Specific topics to be discussed will include salinity, temperature and pressure adaptations, calcification, silicification, marine natural products and toxins, bioluminescence, phytosynthetic light adaptations and marine lipids.
Prerequisite: Organic chemistry, biochemistry
Spring, 3 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 517 Experimental Design and Analysis for Environmental Data
Experience in designing experiments of the type conducted in the field. Use of statistical tools to manipulate, analyze, and interpret environmental data and to reinforce underlying statistical principles by providing students with extensive opportunity for data analysis.
Prerequisite: Biometry or upper level statistics course
Fall, 3 credits

MAR 519 Geochemistry Seminar
This course will explore topics in low temperature geochemistry as chosen by the instructors and participants. The seminar series will be organzed around a theme such as early diagenesis, estuarine geochemistry or aquatic chemistry. Students will be required to lead one of the seminars and to participate in discussions.
Prerequisite: MAR 503 or permission of instructor
Fall, 2 credits

MAR 522 Environmental Toxicology
The ecological and human health effects of toxic chemicals, especially chlorinated hydrocarbons, will be examined. Toxicological principles, carcinogenesis, and economic and political considerations are included.
Spring, 3 credits

MAR 523 Marine Botany
Introduction to seaweeds and seagrasses. Reproductive biology and taxonomy are discussed in terms of ecology, physiology and distribution of seaweeds in temperate and tropical waters. Several trips to rocky shore communities and a regional conference on algae are a required part of the course.
Prerequisite: General botany/ecology, enrollment in Marine Environmental Sciences program or permission of instructor
Spring, 3 credits

MAR 525 Marine Ecology — Critical Reading
Meet one evening every other week for an informal group discussion of scientific papers selected by common interest. Objectives are to practice critical reading and to broaden exposure to marine ecology literature.
Fall and spring, 1 credit

MAR 531 Regional Planning Applied to Marine Sciences
This course will introduce the theories, techniques and literature of regional planning with special emphasis on planning as a decision-making tool related to the marine environment.
Fall, alternate years, 3 credits

MAR 532 Case Studies in Coastal Planning
This course will address the application of regional planning, with marine sciences input, in the development of governmental programs for coastal zone management, water quality control and management. Long Island case studies will be the basis for this course.
Prerequisite: MAR 531
Spring, alternate years, 3 credits

MAR 534 Aquaculture
Biological, economic, practical, social and legal aspects of culturing marine and freshwater organisms, including plants, molluscs, crustaceans and finfish. Basic principles of aquaculture, and successes and failures with selected species. Field trips and the preparation and evaluation of aquaculture proposals.
Spring, 4 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 539 Computer Analysis
Basic introduction in the use of computers for analysis fo research data. Analytical programs available on the University's UNIVAC system are emphasized although some microcomputer applications are discussed. Objectives of the course are to introduce potential problems in experimental design and data collection, and to discuss and conduct analyses of research data.
Prerequiste: Permission of instructor
Spring, 1 credit

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.
Prerequisite: MAR 502 or permission of instructor
Spring, alternate years, 3 credits

MAR 543 Coastal Geology Seminar
Series of weekly seminars dealing with topics of current interest in coastal geology. Coastal geomorphology, shore and inner-shelf processes, sea-level changes and other significant topics concerning coastal sedimentary environments will be discussed.
Prerequisite: Permission of instructor
Spring, 2 credits

MAR 544/GEO 544 Restricted Marine Environments: Ancient and Modern
An intensive and interdisciplinary study of restricted marine environments including anoxic basins and evaporite basins, as they occur in the modern world and as they are represented in the geological record. The chemical, sedimentological and paleoecological importance of these unusual circulation systems will be examined.
Prerequisite: Previous coursework in stratigraphy
Spring, 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 Sciences
This is used to present special-interest courses, including intensive short courses by visiting and adjunct faculty and courses requested by students. Those given in recent years include 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 credit

MAR 553 Fishery Management
Survey of the basic principles of, and techniques for studying, the population dynamics of marine fish and shellfish. Discussion of the theoretical basis for management of exploited fishes and shellfish, contrasting management in theory and in practice using local, national, and international examples. Includes lab exercises in the use of computer based models for fish stock assessment.
Prerequisite: Calculus I or permission of instructor
Fall, 3 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 Ecology of Fishes
Introduction to current research in the ecology of fishes. Topics such as population regulation, migration, reproductive strategies, predator-prey interactions, feeding behavior, competition, life history strategies, and others, will be discussed.
Prerequisite: Familiarity with concepts of ecology or biological oceanography
Spring, 3 credits

MAR 562 Early Diagenesis of Marine Sediments
The course treats qualitative and quantitative aspects of the early diagenesis of sediments. Topics include diffusion and adsorption of dissolved species, organic matter decomposition and storage, and diagenesis of clay materials, sulfur compounds and calcium carbonates. The effects of bioturbation on sediment diagenesis are also discussed. This course is identical to GEO 562.
Prerequisite: Permission of instructor
Fall, alternate years, 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 underway.
Prerequisite: MAR 501, 502, 503, 506 and 580
Spring, 3 credits

MAR 567 Information for Environmental Management
The information needs of environmental managers are explored. To meet these needs, data must be transformed into information. The student will learn the use of microcomputers to organize and anlayze information and to provide suitable output for environmental management.
Prerequisite: Graduate student status or permission of instructor
Fall, 3 credits

MAR 571 Marine Zooplankton Ecology
Acquaints students with marine protozoans and metazoans, and with problems associated with their survival in the sea. Lectures cover anatomy and physiology of the organisms, sampling strategies, zoogeography, speciation, life history strategies, population dynamics, secondary production and food chain interactions. Laboratory project.
Prerequisite: MAR 502 and permission of instructor
Spring, 3 credits

MAR 573 Special Topics—Chemical Oceanography
This course is designed for the discussion of topics of special interest on demand that are not covered in regularly scheduled courses. Examples of possible topics include carbonate chemistry, isotope chemistry or microbial chemistry.
Prerequisite: Permission of instructor
Fall, spring, 1-4 credits

MAR 574 Special Topics—Physical Oceanography
The course is designed for the discussion of topics of special interest on demand that are not covered in regularly scheduled courses. Examples of possible topics include atmosphere–ocean interaction, diffusion or dispersion in the ocean.
Prerequisite: Permission of instructor
Fall, 1-4 credits

MAR 575 Special Topics—Geological Oceanography
The course is designed for the discussion of topics of special interest on demand that are not covered in regularly scheduled courses. Examples of possible topics include coastal processes, fluvial processes, physics of sediment transport, or groundwater flow.
Prerequisite: Permission of instructor
Fall, spring, 1-4 credits

MAR 576 Special Topics—Biological Oceanography
The course is designed for the discussion of topics of special interest on demand that are not covered in regularly scheduled courses. Examples of possible topics include grading in benthic environment, coastal upwelling, nature of marine eco-systems or marine pollution processes.
Prerequisite: Permission of instructor
Fall, 1-4 credits

MAR 577 Special Topics—Coastal Zone Management
The course is designed for the discussion of topics of special interest on demand that are not covered in regularly scheduled courses. Examples of possible topics include Microcomputer Information Systems, Environmental Law, Coastal Pollution, Dredge Spoil Disposal and Science and Technology in Public Institution Coastal Marine Policy.
Prerequisite: Permission of instructor
1-4 credits

MAR 580 Seminar
A weekly series of research seminars presented by visiting scientists and members of the staff.
Fall and spring, 1 credit each semester, repetitive

MAR 585 Coastal Geology Seminar
An assessment of recent developments in coastal geology. Discussion of advancements in the application of sedimentology, stratigraphy and geomorphology to the study of coastal environments. Modern-ancient analogues will be emphasized where appropriate.
Prerequisite: Stratigraphy and sedimentology, marine geology
Spring, 2 credits

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: MAR 555 or permission of instructor
Spring, 2 credits

OCN 603 Biology of Bivalve Molluscs
Introductory lectures followed by class discussion of selected readings from the primary literature, dealing with taxonomy, anatomy, feeding and filtration, reproduction, physiology, life histories, population dynamics, and ecology of suspension feeding bivalve molluscs. Critical reading of the literature and participation in class discussion is expected.
Prerequisite: Invertebrate zoology or permission of instructor
Fall, 3 credits

OCN 610 Waves and Tides
Theory of surface and internal waves, wave generation and forecasting, tide theory, analysis and predictions of tides and tidal currents.
Prerequisite: MAR 501 or permission of instructor
Spring, alternate years, 3 credits

OCN 612 Dynamical Oceanography I
The first course in a two 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 619 Coastal Trapped Waves
Study of low frequency wave propagation on the continental shelf and around islands. Development of basic dynamics of edge waves, Kelvin waves, and shelf waves. Examples from experiments
Prerequisite: MAR 501, OCN 612 or permission of instructor
Fall, alternate years, 2 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 631 Seaweed Productivity
This course examines physiological and ecological aspects of primary production in seaweeds by reviewing current and classic literature. Topics include photosynthesis and respiration, biomass and growth, spatial and temporal variation, limiting factors, competition and herbivory. Students will have the opportunity to participate in a research project.
Prerequisite: MAR 523 or permission of instructor
Fall, 2 credits

OCN 650 Dissertation Research
Original investigation undertaken with the supervision of research committee.
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, alternate years, 2 credits

OCN 670 Practicum in Teaching
Fall and spring, 1-3 credits, repetitive

OCN 673 Zooplankton Population Dynamics
Course will examine in detail the methods used for measurement and calculation of the population dynamics and production of marine zooplankton, including the protozoans, ctenophores, chaetognaths, cladocerans, copepods, euphausiids, amphipods, molluscs and urochordates.
Prerequisites: Graduate standing; BEE 563/OCN 563 recommended
Spring, alternate years, 3 credits

OCN 674 Estuarine Oceanography
Physical and chemical properties of estuarine waters, and the classification of estuaries by geomorphological and hydrographical parameters. Kinematics and dynamics of motion and mixing in estuaries.
Prerequisite: MAR 501
Spring, 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 the 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 energy in the nearshore zone, and wave refraction.
Prerequisites: MAR 501 and MAR 555 or permission of instructor
Spring, 3 credits

W. Averell Harriman College for Policy Analysis and Public Management

Dean: Gerrit Wolf
Harriman Hall (516)632-7175

Graduate Studies Director: Owen Carroll
Harriman Hall

Three major forces have changed management thought over recent decades. First, analytical techniques were developed for making decisions. Second, the information revolution has created the ability to process amounts of complex information quickly. Third, applied behavioral science research has produced the knowledge of how to develop entrepreneurial managers. These three factors can transform organizations from burdensome bureaucracies into productive, enlightened and humane workplaces.

The Harriman College program led the way in training students in decision analytic techniques of economics, statistics and model building. Graduates have become policy analysts in government and industry implementing these techniques. These analytic techniques have been mastered by students using PCs and implemented through practical projects and internships in the field.

The curriculum now adds courses in institutional and organizational knowledge to produce entrepreneurial managers. This knowledge shows similarities, differences and interdependences among the public, nonprofit, and private sectors. The curriculum offers: knowledge of the values, history and culture of the public, nonprofit, and private sectors; managerial courses focusing on strategy, operations, accounting, finance and organization in public, nonprofit, or private firms; decision models using model building, data analysis and economics that apply and integrate techniques of analysis to solve policy and management problems using computers and actual cases; problem solving opportunities that implement plans, ideas, results, and interests.

Curriculum is only part of a successful program. The other parts of a program are also important. First, the program gives personal attention because it is small. There are 50 part-time and 50 full-time students. Plans are to increase in size gradually while continuing to strive for excellence.

Second, the program draws on faculty and resources from across the University, including the Institute for Decision Sciences and the Economic Research Bureau, creating an interdisciplinary excitement.

Third, renovated facilities will provide a setting for studying, socializing, computing, learning and discussing.

Fourth, the Alumni Association of 400 graduates and a placement director foster careers and promote job opportunities and placements in the public, nonprofit, and private sectors.

Curriculum

For the person who has completed an undergraduate arts and sciences degree and plans to be a full-time student, the curriculum is taken over two years; the summer between the two years has a paid internship requirement.

Options for Part-Time Working Students

The part-time program is designed for the person who has been working for several years in government, a nonprofit organization, or in business who is now seeking career advancement. Courses are offered in the late afternoon and evening. The field internship requirement is tailored to projects demonstrating the applications of knowledge to on-the-job practices where the student is employed. Field study is required each semester.

Concentrations and Core Courses

There are three concentrations: Government, Nonprofit Management and Enterprise Management. Each concentration has six courses especially designed for the concentration. Core courses common to all three concentrations are Microeconomics (PAM 533), Data Analysis (PAM 515), Model Building (PAM 543), Comparative Institutions (PAM 512), Applied Analysis (PAM 516), Group Project (PAM 541), Communications (PAM 564), and Value Dilemmas (PHI 522).

The Government concentration courses for students planning careers in public service are: Public Policy (POL 533), Organizational Decision Making (POL 617), Public Operations Research (PAM 518), Public Accounting (POL 540), Public Finance (PAM 534), and Planning (POL 531).

The Nonprofit concentration courses for students working in the independent sector are: Nonprofit Institutions (PAM 578), Program Evaluation (POL 535), Financial Accounting (PAM 536), Financial Management (PAM 535), Management of Organizations in Public Sector (PAM 581) and Entrepreneurship (PAM 579).

The Enterprise concentration course for students entering a business career are: Regulation (POL 537), Organizational Aspects of Management (EMP 501), Production (EMP 506), Accounting (EMP 502), Corporate Finance (ECO 408), and Corporate Strategy (EMP 500).

The curriculum thus includes a) the common core, b) concentration courses and c) elective courses taken from departmental offerings of the College of Arts and Sciences, the College of Engineering and Applied Sciences, and the Marine Sciences Research Center. Elective courses provide the student with preparation in the areas of high tech management, international affairs, environmental policy, financial policy analysis, decision sciences, human resources management, social and health services, arts management, new ventures and urban studies.

A Master of Science degree is awarded upon successful completion of the program.

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.

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. 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.

Each student will work with an advisor in developing his or her program of study. Students seeking additional information should request a copy of the Harriman College Handbook by contacting Owen Carroll, Graduate Studies Director.

Research

In addition to preparing students for careers in policy and management, the Harriman College carries on research, the aim of which is to provide managers with information and analysis that will contribute to improving the quality of managerial decision-making and imple-

mentation. 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 research institutes of the Harriman College: the Institute for Decision Sciences, the Institute for Technology Policy in Development and the Economic Research Bureau.

Facilities

The Harriman College occupies two floors of the W. Averell Harriman Hall. Besides faculty and administrative offices, it has six classrooms of varying size. 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 eight desk-top computers (six 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 solutions of organizational problems. Each studnet 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 requirements of the Graduate School:

A. A baccalaureate degree with minimum grade point average of 3.0. 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 Graduate Record Examination (GRE) General Test scores.

D. Three letters of recommendation, one of which, if possible, should be from a professional working in a public agency or community or private organization, who is capable of evaluating the applicant's motivation and potential for public sector work; the three letters of recommendation should also include at least one from a college faculty member, counselor or administrator.

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 April 1, although earlier submissions are encouraged. Applications are reviewed between January and April for the following fall semester. Decisions concerning aid will be made not later than the April 1 deadline for applications. Late applications are accepted if there are places available.

Application forms may be obtained by writing to:

Graduate Studies 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. 60 credits comprised of eight core courses, six special courses and five elective courses. For the special Advanced Credit Curriculum described above, the degree requirements are: 1) a graduate degree from SUNY at Stony Brook from a department outside of the Harriman College; 2) 30 prescribed credits in the Harriman College; 3) an internship.

B. An overall 3.0 average.

C. A summer internship or equivalent in field studies.

D. A comprehensive internship 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., Associate Professor.[1] Ph.D., 1980, Harvard University: U.S. foreign relations; 20th century U.S.; modern Japan.

Ben-Ner, Avner, Assistant Professor. Ph.D., 1981, State University of New York at Stony Brook: Applied microeconomics, comparative economics.

Brodkin, Evelyn, Assistant Professor.[3] Ph.D., 1983, Massachusetts Institute of Technology: Urban politics and policy.

Cameron, Charles, Lecturer.[3] Ph.D. expected 1986, Princeton University: Policy analysis, American politics and policy, political economy.

Carroll, T. Owen, Associate Professor and Graduate Studies Director.[2] Ph.D., 1968, Cornell University: Energy systems; information systems.

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.

Koppelman, Lee E., Professor.[1] Ph.D., 1967, New York University: Planning; energy policy; local government and intergovernmental relations.

McGuire, Therese, Assistant Professor. Ph.D., 1983, Princeton University: Microeconomics and public finance.

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, Anne E., Assistant Professor. Ph.D., 1983, Harvard University: Microeconomic theory, applied econometrics.

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.

Schneider, Mark, Professor.[3] Ph.D., 1974, University of North Carolina at Chapel Hill: Urban public policy, urban service delivery, administration and public policy.

Scholz, John, Associate Professor.[3] Ph.D., 1977, University of California, Berkeley: Policy implementation and evaluation; regulation; economic development and comparative policy analysis.

Sexton, Thomas T., Associate Professor. Ph.D., 1979, State University of New York at Stony Brook: Operations research, specifically, as applied to the analysis of transportation problems.

Sobel, Matthew, Professor. Ph.D., 1967, Stanford University: Production and stochastic processes.

Weiner, Harry, Associate Professor and Director of Sloan Program. S.M., 1970, Massachusetts Institute of Technology: Redesign of organizational structures to improve programmatic capabilities.

Weinstein, Joan, Lecturer and Internship Coordinator. M.A., 1965, University of California, Berkeley: Interpersonal communications; family policy.

Wolf, Gerrit, Professor and Co-director of Institute for Decision Sciences, Dean. Ph.D., 1967, Cornell University: Decision and organizational behavior.

Yago, Glenn, Assistant Professor. Ph.D., 1980, University of Wisconsin: Industrial and managerial strategies for competitiveness in productivity, employment and capital markets.

Young, Dennis R., Professor. Ph.D., 1969, Stanford University: Organization of public and nonprofit services and the evaluation of their performance.

Number of teaching, graduate and research assistants, fall 1985: 27

[1] *Adjunct faculty*
[2] *Recipient of the State University Chancellor's Award for Excellence in Teaching, 1973-74.*
[3] *Department of Political Science*

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 particular area in the first-year curriculum, exemption is permitted and an advanced course in that area is taken.

PAM 512 Comparative Institutions
Historical, legal, political, and cultural perspectives on the roles and interrelationships of government, nonprofit organizations and business.
Fall, 3 credits

PAM 515 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.
Fall, 4 credits

PAM 516 Applied Analysis
Application of knowledge from microeconomics, model building and statistics to solving complex managerial and policy problems using PCs, standard programs and actual data.
Prerequisites: PAM 515, 533, and 543
Spring, 3 credits

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.
Spring, 3 credits

PAM 533 Economic Theory
The techniques and approaches of microeconomic reasoning are applied to issues of 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, 4 credits

PAM 541 Group Project
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.
Spring, 3 credits

PAM 543 Modeling Techniques
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, 4 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

SECOND YEAR

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 of public agencies, regulation exit and voice theory, metropolitan governance and the role of formal planning.
Fall, 3 credits

PAM 534 Public Finance
Normative and positive economic analysis of the public sector. Description and evaluation of the existing system of government taxes, expenditures and transfers. Applied welfare economic analysis of types of market failure including public goods and externalities. Analysis of distortions to economic behavior caused by the imposition of taxes or subsidies. Equity and efficiency and optimal taxation.
Fall, 3 credits

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 536 Critical Issues in Urban 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 545 Family Policy
An overview of the history, principles, and domains of family policy. Specific areas of study will include the effects of the industrial revolution and the protestant reformation on the family and on family/state relations; the policy implications of feminism and other recent revolutions, such as those in the areas of medicine and technology; selected policy domains such as reproduction, child care, child and spouse abuse, income security, and taxation; and cross-cultural perspectives on family policy.
Fall, 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 579 Entrepreneurship and Strategy for Nonprofit Organizations
This course presents the principles and techniques of strategic management by which an organization sets and implements its long-range direction. This includes the processes of environmental scanning, self assessment of organizational purpose and comparative advantage, and synthesis of organizational mission, plans and strategic initiatives. Special attention is given to the study of the entrepreneurship process through which programs, resources, and new organizations are developed in the nonprofit sector, and to the subject of profitmaking ventures by nonprofit organizations. Extensive use is made of case studies.
Spring, 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 accommodate innovative subject matter on an experimental basis and provide the opportunity of offering courses taught by visiting faculty.
Fall and spring, 3 credits each semester, repetitive

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 plan-

ning, 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 accommodate independent research projects on an individual basis with faculty guidance.
Fall and spring, variable and repetitive credit

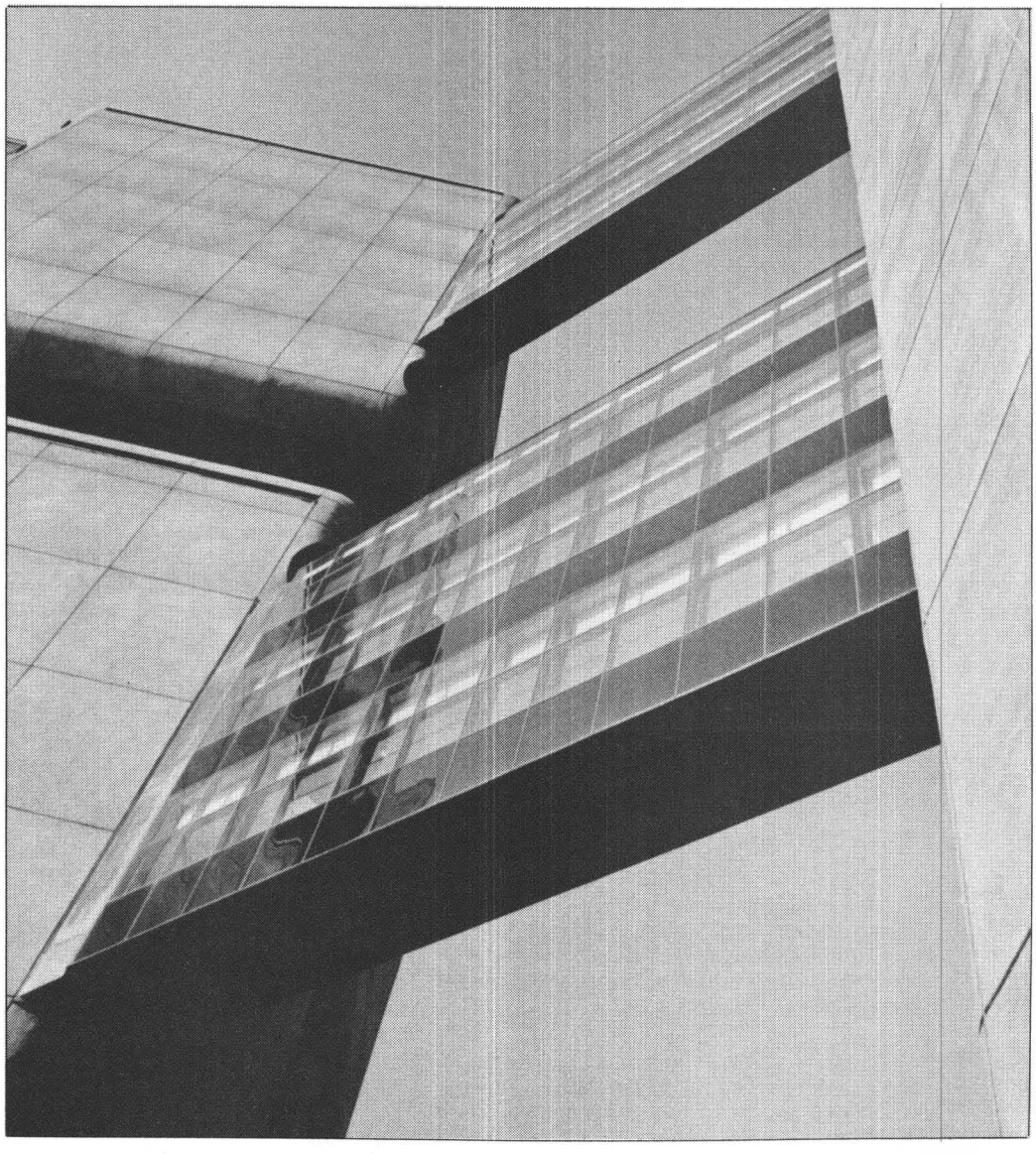
PAM 596 Small Group Studies in Policy Analysis and Public Management
Designed to accommodate ad hoc small group student research projects on an experimental basis. Projects will be designed by PAM faculty and students. Topics will be announced at the beginning of each semester.
Fall and spring, 1-3 credits 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 requirements.
Fall and spring, variable credit

PAM 598 Field Studies
A field project that includes a plan, implementation of the plan and a report under supervision of a faculty member.
Prerequisite: Permission of the Dean
Fall and spring, 3 credits

PAM 599 Internship Practicum
Original internship undertaken with the supervision of an advisor.
Prerequisite: Permission of the Dean
Fall and spring and summer, 1 credit

Health Sciences



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.

The University Hospital serves the health care needs of the residents of Long Island and provides training for physicians and other health-care professionals. Since opening in 1980, the hospital has strived to utilize the very latest in medical knowledge and technologies to meet the needs of its patients.

The 540-bed hospital offers a variety of highly specialized services, including neonatal intensive care, high-risk obstetrics, cardiology, oncology, medical/surgical intensive care units, acute psychiatric services for adults and children and advanced diagnostic and treatment facilities, such as the CAT scanner, lasers and nuclear medicine.

University Hospital serves many regional roles, housing one of the nation's 14 Allergic Disease Centers. Designated a Perinatal Center and Regional Transplantation Center, the hospital serves as the region's Burn Center, Cardiac Diagnostic and Surgical Center, Regional Oncology Center and Sleep Disorders Center.

The hospital provides training for over 300 residents in 15 specialty programs: general surgery, medicine, anesthesiology, orthopaedics, radiology, psychiatry, pediatrics, family practice, pathology, neurology, gynecology, dental medicine, public health, urology and radiation oncology.

The objectives of the Health Sciences Center are 1) to increase the supply and proficiency of health professionals in fields of demonstrated regional, state and national need, 2) to provide health care of sufficient variety and quality to enable professional education and related research to occur, 3) to sustain an environment in which research in health and related disciplines can flourish, and 4) to emerge as a regional resource for advanced education, patient care and research in broad areas of health.

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 encouraged to address their inquiries to the appropriate school or department.

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 fieldwork, work for a specific time with some of the Long Island health and welfare agencies. Continuing education for many health professions is offered by the schools. The center also sponsors conferences, workshops and lectures on major health issues for the general community.

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 in the Health Sciences section of this *Bulletin.*

The *Health Sciences Center Bulletin* can be obtained by writing to or telephoning the Health Sciences Center Office of Student Services, 516 444-2111, or the Office of the Dean of a specific school.

School of 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.

All candidates must hold a baccalaureate degree, submit Graduate Record Examination (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, N.Y. 11794-8204
(516) 444-3240

School of Dental Medicine

The School of Dental Medicine is accredited by the Council on Dental Education of the American Dental Association. The school provides students with a broad educational background and trains graduates to enter into general practice, specialty programs, public health, teaching and/or research. The school has incorporated programs, the disciplines of prosthodontics, operative dentistry, endodontics and dental materials, into a single department of restorative dentistry. Orthodontics and pedodontics have been combined into a department of children's dentistry. Other departments in the school and periodontics, oral and maxillofacial surgery, dental health (which provides training in the supportive aspects of clinical practice) and oral biology and pathology.

Dental and medical students, as well as students from other health sciences fields, take the same courses in anatomy, biological chemistry, microbiology, pathology, pharmacology and physiology. The correlation of the basic sciences with dentistry is primarily provided by the faculty of the department of oral biology and pathology.

The school has affiliation agreements with a number of major regional hospitals, including Long Island Jewish Medical Center, the Veterans Administration Medical Center at Northport, and the Nassau County Medical Center. These institutions, together with the University Hospital at Stony Brook, provide the environment for students to observe the effect of systemic disease on the structures of the oral cavity, and to participate as members of a health care team in the treatment of patients.

Small class size allows students to receive highly personalized instruction. Didactic as well as clinical instruction is readily adapted to the needs of the individual student.

Students in the school receive approximately 900 hours of instruction in the traditional basic sciences (anatomy, biochemistry, cytology, microbiology, physiology, pharmacology, genetics, and general pathology). This instruction is fundamental to all students in dentistry and medicine, and most courses are taken jointly by these students.

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, N.Y. 11794-8707
(516) 444-2805

School of Medicine

The School of Medicine consists of basic science and clinical departments which have the responsibility for preclinical and clinical instruction of students in all the schools of the Health Sciences Center as well as University-wide responsibility to students in other schools on the campus. Basic science departments include the departments of anatomical sciences, biochemistry, microbiology, neurobiology and behavior, oral biology and pathology (in conjunction with the School of Dental Medicine), pathology, pharmacological sciences, and physiology and biophysics. Clinical departments include the departments of anesthesiology, community and preventive medicine, dermatology, family medicine, medicine, neurological surgery, neurology, obstetrics and gynecology, ophthalmology, orthopaedics, otorhinolaryngology, pediatrics, physical medicine and rehabilitation, psychiatry and behavioral science, radiation oncology, radiology, surgery, and urology. In addition to instruction at the undergraduate and professional levels, these departments have major responsibility for graduate, postgraduate, and continuing education.

Graduate studies in basic science are closely coordinated with those in the division of biological sciences and are conducted under the general regulations of the Graduate Council and the Vice Provost for Research and Graduate Studies. See page 192.

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, N.Y. 11794-8432
(516) 444-2113

School of Nursing

The School of Nursing offers a graduate program leading to the Master of Science degree. The graduate program offers clinical specialization and prepares graduates for the multi-faceted role of nurse practitioner/clinical specialist, in preparation for life-long learning and professional advancement. Research is a vital element of the program. Graduates are ready to assume the management, education and consultation responsibilities of senior clinical positions. Students may choose one of the following areas of specialization:

Family Health
Mental Health
Perinatal/Women's Health
Critical Care

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

School of Social Welfare

The school's programs are designed to prepare students for various levels of professional practice in the field of social welfare. These programs include a two-year graduate program leading to the Master of Social Work degree which prepares students for entry into advanced social work practice. A joint M.S.W.-Ph.D. is offered with the Department of Sociology. Students also have an opportunity to develop individualized joint M.S.W.-Ph.D. programs with other graduate departments in the University.

The graduate and undergraduate programs of the school are accredited by the Council on Social Work Education.

The graduate program prepares students with the needed theoretical and practice expertise to function with maximum competence at different administrative or policy levels in social welfare fields or in the provision of direct services to individuals, families, groups, and communities. The school provides opportunities for study and practice that utilize the wealth of interdisciplinary resources available in the Health Sciences Center and throughout the University.

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 fieldwork requirements. Courses are offered evenings and weekends.

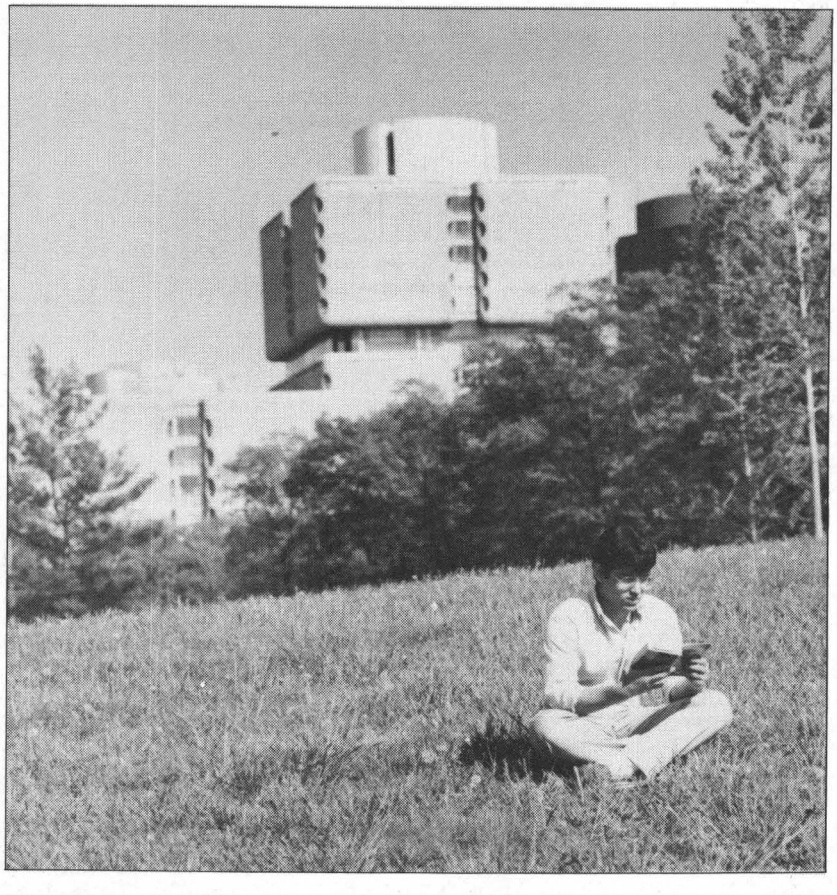
Applicants will be evaluated, in part, on the basis of the congruence of their interests with the school's resources and commitments. A major attempt is made to build ethnic, income and sexual diversity into the student body.

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

School of Medicine and School of Dental Medicine

Associate Dean Nicholas Delihas
School of Medicine, Health Sciences Center
Level 4, Room 179
(516)444-2312



The Graduate Programs in Basic Health Sciences

The School of Medicine 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 entrance standards and degree requirements. The various graduate studies programs 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.

Students wishing to pursue a combined M.D./Ph.D. program should apply for admission to the School of Medicine since admission to one degree program does not guarantee admission to the other.

The preclinical disciplines fundamental to the health professions are organized in the School of Medicine. These disciplines are represented by the Departments of Anatomical Sciences, Biochemistry, Microbiology, Neurobiology and Behavior, 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. The graduate programs in Biochemistry and Neurobiology and Behavior are administered by the Division of Biological Sciences (see Biological Sciences section of this *Bulletin*). The Basic Health Sciences Departments of the School of Medicine, 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 Studies Director: Norman Creel
Health Sciences Center T-8, Room 060 (516)444-3119

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 Studies Director, Dr. Norman Creel.

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 (GRE) 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., Associate Professor. Ph.D., 1976, University of Illinois: Physiology and biophysics of junctional and excitable membranes.

Cohen, David H., Professor. Ph.D., 1963, University of California, Berkeley: Cellular mechanisms of conditioning; neural control of the heart.

Creel, Norman, Associate Professor and Graduate Studies Director. 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.

Krause, David W., Assistant Professor. Ph.D., 1982, University of Michigan: Vertebrate paleontology: mammalian evolution; functional morphology of masticatory and locomotor systems.

Larson, Susan G., Research Assistant Professor. Ph.D., 1982, University of Wisconsin: Functional morphology of human and nonhuman primate locomotor systems; human and primate evolution; telemetered electromyography.

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, 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.

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. Ph.D., 1976, University of Chicago: Functional morphology and behavior of primates; evolution of apes and humans; gross anatomy.

Walcott, Benjamin, Associate Professor. Ph.D., 1968, University of Oregon: Comparative neurophysiology; comparative muscle structure and function; sensory integration; electron microscopy.

Williamson, David L., Professor. Ph.D., 1959, University of Nebraska: Genetics: maternally inherited infections: biology of spiroplasmas.

Zieve, Gary W., Assistant Professor. Ph.D., 1977, Massachusetts Institute of Technology: Microtubules and associated proteins; mitotic apparatus; nuclear structure.

Number of teaching, graduate and research assistantships, fall 1985: 10

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 embryology, functional and topographic anatomy, clinical correlations and introduction to radiology.
Prerequisite: Permission of instructor
Spring modules, 7 credits

HBA 534 Neuroanatomy for Medical Students
An overview of the structure and organization of the human central nervous system. Special emphasis on functional pathways. Laboratory included. Open only to full-time SUNY graduate students.
Prerequisite: Permission of instructor
Spring modules 7 and 8, 3 credits

HBA 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. 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 with emphasis on how to fix and embed tissues, prepare ultrathin sections, process electron microscope photographs, and interpret ultrastructural details. Theory of electron optics will be discussed where applicable. 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
An introduction to biomechanics. Covers free-body mechanics and kinetics as applied to vertebrate locomotion. Considers the structure and physiology of muscle as it relates to adaptations of the musculoskeletal system.
Prerequisites: Introductory physics and biology or permission of instructor
Fall, even 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 primates prior to the origin of the human lineage. Laboratory included. Open to senior undergraduates.
Prerequisite: Permission of instructor
Spring, alternate 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. Crosslisted with ANT 565.
Prerequisite: Permission of instructor
Spring, alternate 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, alternate 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, alternate years, 2 credits

HBA 582 Comparative Anatomy of Primates
The comparative anatomy of living primates. Laboratory dissection with emphasis on relating structural diversity to behavior and biomechanics.
Prerequisites: HBA 364 and previous course in human or vertebrate anatomy and permission of instructor.
Fall, 4 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
An introduction to the structural organization of cells and tissues as they relate to function. Emphasis on cell organelle structure and function in specialized cells in tissues. Covers the organization and interaction of cells in tissues and comparative examples of tissues from vertebrates and invertebrates. Crosslisted with BCD 656.
Prerequisite: Baccalaureate degree in science or permission of instructor
Spring, 3 credits

HBA 657 Developmental Biology
The developing systems at all levels from the morphological to the molecular utilizing material from both animal and plant kingdoms. Emphasis on molecular and cellular approaches to the basic principles of development, the mechanisms of storage, recruitment and utilization of genetic information during early embryogenesis, molecular and cellular aspects of pattern formation, mechanisms of cell and tissue interaction during development and regulation of gene expres-

sion during terminal differentiation. 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, 1 credit 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, 1-9 credits, repetitive

HBA 695 Practicum in Teaching
Practice instruction in the teaching of anatomical sciences carried out under faculty supervision.
Prerequisite: Permission of instructor
Fall and spring, 1-4 credits, repetitive

Molecular Microbiology (HBM)

Chairperson: Eckard Wimmer
Life Sciences Building, Room 280 (516)632-8787

Graduate Studies Director: Patrick Hearing
Life Sciences Building, Room 214

Graduate study 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 the molecular biology of eukaryotic cells and animal viruses, and of bacterial and yeast genetics. The recommended coursework is designed to cover cell biology, biochemistry, genetics, molecular biology and developmental biology. Students initially are given the opportunity to conduct short-term research projects in two or three different laboratories, followed by concentration on a major dissertation research project. Further details may be obtained from the Graduate Studies 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 550 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 and hybridoma facility, glassware washing facility, analytical equipment lab, protein and nucleic acid sequencing lab, environmental rooms, electron microscope and darkrooms, 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 66,000 books and 750 journal titles. The Health Sciences Library, located in the Health Sciences Center, contains collections of biological and medical books and journals presently totaling 213,692 volumes, including 4,300 journal titles. In addition, the Department of Microbiology maintains its own reading room with a collection of about 1,000 volumes of 11 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 (GRE).

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 $9,000 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 National 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:

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
Introduction to Physical Chemistry (mini course)
Biochemistry of Macromolecules (mini course)
Experimental Microbiology (lab rotations)
Microbiology Seminar

Spring
Introductory Biochemistry II
Graduate Genetics
Physical Chemistry of Macromolecules (mini course)
Experimental Microbiology (lab rotations)
Microbiology Seminar

2. Second Year

Fall
Molecular Biology of the Cell
Molecular Aspects of Immunology
Graduate Research
Microbiology Seminar

Spring
Animal Virology
Readings in Microbiology Literature
Graduate Research
Microbiology Seminar

D. In addition to the above offerings, the department regularly offers short courses in Computer Methods for Nucleic Acid Sequences, Monoclonal Antibodies, and Cancer Biology.

E. The Qualifying Exam is taken at the end of the second year of study.

Faculty

Anderson, Carl W., Adjunct Associate Professor[1] Ph.D., 1970 Washington University: Protein synthesis; molecular biology of adenovirus. protein phosphorylation.

Bauer, William R., Professor. Ph.D., 1968. California Institute of Technology: DNA-protein interactions; regulations of transcription in vaccinia virus; structure of superhelical DNA.

Brugge, Joan S., Associate Professor. Ph.D., 1975. Baylor College of Medicine: Oncogenes and transformation; role of cellular tyrosine kinases; normal cellular growth control and differentiation; regulation of enzymatic activity of protein kinases.

Bynum, R. David, Assistant Professor and Director of Microbiology Laboratories. 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 Studies Director. Ph.D., 1972, Yale University: Protein processing in eukaryotic cells: reovirus replication; viral cytoskeletal interactions.

Delihas, Nicholas, Professor and Associate Dean for Basic Sciences. Ph.D., 1961, Yale University: Structure, function and evolution of small RNAs; mechanisms of RNA-protein interactions.

Dunn, John J., Adjunct Professor[1] Ph.D., 1970, Rutgers University: Transcription, processing and translation of RNA.

Enrietto, Paula J., Research Assistant Professor. Ph.D., 1980, University of Colorado: The role of the oncogene *myc* in viral transformation and the determination of target cell specificity.

Fields, Stanley, Assistant Professor. Ph.D., 1981, University of Cambridge, England: Control of gene expression in yeast.

Friedling, Steven P., Adjunct Assistant Professor. M.D., 1968, State University of New York, Downstate Medical Center: Clinical infectious disease.

Gluzman, Yakov, Adjunct Associate Professor.[2] Ph.D., 1977, Weizmann Institute, Israel: Mechanism of transformation induced by small DNA tumor viruses (SV40, adenovirus).

Grodzicker, Terri, Adjunct Associate Professor.[2] Ph.D., 1969, Columbia University: Genetics of DNA tumor viruses: genetic analysis of viral regulatory functions; analysis of adenoviral vectors.

Harlow, Edward E., Jr., Adjunct Assistant Professor.[2] Ph.D., 1982, Kings College, University of London: Biological role of nuclear oncogenes; molecular and cellular biology of the adenoviral transforming proteins and the cellular p53 oncogene; protein immunochemistry of viral and cellular transforming proteins.

Hayman, Michael J., Professor. Ph.D., 1973, National Institute for Medical Research, England: Mechanism of transformation by retroviral oncogenes; erythroid differentiation.

Hearing, Patrick, Assistant Professor. Ph.D., 1980. Northwestern University: Adenovirus molecular genetics: eukaryotic transcriptional regulation.

Herr, Winship, Adjunct Assistant Professor.[2] Ph.D., 1982, Harvard University: Transcriptional control mechanisms in mammalian cells.

Jacobson, Ann B., Research Associate Professor. Ph.D., 1962, University of Chicago: Comparative studies on related coliphage RNAs: correlation of structure and function

Katz, Eugene R., Professor. Ph.D., 1969, University of Cambridge, England: Developmental genetics studies on *Dictyostelium discoideum;* the role of membrane sterols in cell growth and development.

Kim, Charles W., Associate Professor. Ph.D., 1956. University of North Carolina at Chapel Hill: Cell-mediated immunity to parasites; thymocyte migration studies.

Mathews, Michael B., Adjunct Associate Professor.[2] Ph.D., 1969, University of Cambridge, England: Control of translation and transcription in human cells.

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: Molecular neurobiology; regulation of neural gene expression.

Milazzo, John P., Adjunct Lecturer. M.S., 1965, Adelphi University: Application of computer analyses to biological problems.

Muzyczka, Nicholas, Associate Professor. Ph.D., 1974, The Johns Hopkins University: Construction of mammalian vectors; gene therapy; viral genetics; biochemistry of viral DNA integration, excision and replication.

Oliver, Donald B., Assistant Professor. Ph.D., 1980, Tufts School of Medicine: Analysis of the protein export machinery in *E. coli:* its genetics, regulation and biochemistry.

Pavlova, Maria, Adjunct Associate Professor.[1] M.D., 1957, Plovdiv Medical School, Bulgaria; Ph.D., 1969, Charles University, Czechoslovakia: Interaction between chemical carcinogens and tumor viruses in carcinogenesis.

Setlow, Jane K., Adjunct Professor.[1] Ph.D., 1959, Yale University. Recombination and repair of microbial DNA.

Stillman, Bruce W., Adjunct Assistant Professor.[2] Ph.D., 1979, Australian National University: Mechanism of DNA replication, particularly adenovirus, SV40 and yeast.

Tegtmeyer, Peter, Professor. M.D., 1960, Saint Louis University: Regulation of gene expression and DNA replication; mechanism of binding of proteins to DNA.

Viola, Michael V., Joint Professor of Medicine and Microbiology. M.D., 1964, McGill University School of Medicine, Montreal: Molecular genetic basis for susceptibility to cancer in humans; biological properties of the *ras* oncogene product.

Wimmer, Eckard, Professor and Chairperson. Ph.D., 1962, University of Gottingen, Federal Republic of Germany: The molecular biology of poliovirus replication and the molecular basis of picornaviral pathogenesis.

Number of teaching, graduate and research assistants, fall 1985: 37

[1] *Brookhaven National Laboratory*
[2] *Cold Spring Harbor Laboratory*

Courses

HBM 502 Introduction to Physical Chemistry
Introduction to the basic principles of physical chemistry as they relate to biological science. The topics covered are principles of thermodynamics; fundamentals of the chemistry of solutions; free energy and chemical equilibrium; and physical chemistry of polyelectrolyte solutions.
Prerequisite: Permission of instructor
Fall, 1 credit

HBM 503 Molecular Genetics
Introduces the classical work and current developments in lower and higher genetic systems. Covers gene structure and regulation in prokaryotic and eukaryotic organisms, mutational analysis and mapping, transposable elements, and biological DNA transfer mechanisms. Bacteriophage as well as lower and higher eukaryotic systems are used to illustrate aspects of molecular genetic structure and function.
Prerequisite: Permission of instructor
Fall, 3 credits

HBM 504 Biochemistry of Macromolecules
The chemical and physical properties of nucleic acid components will be studied. On this basis the principles of mutagenesis, sequence analyses, formation and melting of 2° structure, nuclease action, and the function of RNA structure in RNA processing will be discussed. Examples implicating primary and secondary structures of nucleic acid in gene regulation will be given. Finally, the methods of (automated)

oligonucleotide and oligopeptide synthesis will be studied and the use of these oligomers in molecular biology discussed.
Prerequisite: Permission of instructor
Fall, 2 credits

HBM 505 Physical Chemistry of Macromolecules
Introduction to the structure and interactions of selected biological macromolecules. Emphasis will be on the nucleic acids. Representative topics include primary, secondary, and tertiary structures of DNA; topological aspects of DNA; energetics of nucleic acids; binding interactions; DNA-protein interactions; and helix coil transitions.
Prerequisite: Permission of instructor
Spring, 1 credit

HBM 509, 510 Experimental Microbiology
An introduction to modern microbiological research. During the course, the student rotates through two professors' laboratories spending approximately one-half semester in each. The selection of laboratories is made by the student in consultation with his or her advisory committee. By taking part in ongoing projects the student will learn experimental procedures and techniques and become acquainted with research opportunities in the department.
Prerequisites: Matriculation in a graduate program and permission of the Graduate Studies Director.
Fall and spring, 1-8 credits each semester

HBM 531 Medical Microbiology
Information derived from molecular and experimental cellular biology will be presented to provide a foundation for understanding the basic aspects of the growth, regulation, structure and function of viruses, prokaryotic and eukaryotic cells. The properties of the infectious agents will be correlated to human diseases caused by these agents. Laboratory experiments will demonstrate basic techniques to identify and quantitate microorganisms.
Prerequisite: Permission of instructor
Spring modules, 1-4 credits

HBM 599 Graduate Research
Original investigations under faculty supervision.
Prerequisite: Permission of instructor
Fall and spring, 1-8 credits each semester

HBM 611 Molecular Biology of the Cell
The topics covered include composition and structure of the plasma membrane; ion transport; endocytosis and exocytosis; cellular organelles; protein trafficking; nucleus and chromatin structure and function; cytoskeleton; cell cycle; cell communication; and intracellular signal transduction. The course is organized as discussions of required reading material led by the instructor and an expert in the field under discussion.
Prerequisites: One year of graduate study and permission of the 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. Attributes of all major virus groups are considered. Focus on original data rather than on review articles.
Prerequisite: Permission of instructor
Spring, 3 credits

HBM 621, 622 Short Courses in Microbiology
Upon occasion the department will present short courses covering topics in microbiology at an advanced level. Classes will meet one or two periods for three to five weeks. Announcement of the courses will be made by sending notices to University departments.
Prerequisite: Permission of instructor
Fall and spring, 1 credit

HBM 690 Microbiology Seminar
A weekly meeting devoted to current work in the department. Enrolled students present seminars each week throughout the semester.
Prerequisite: Permission of instructor
Fall and spring, 1 credit each semester, repetitive

HBM 691 Readings in Microbiology Literature
Readings in microbiology literature covering areas of molecular biology and genetics.
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 under the supervision of the thesis advisor and advisory committee.
Prerequisite: Permission of thesis advisor
Fall and spring, 1-9 credits

HBM 800 Full-Time Summer Research
Full-time laboratory research projects supervised by faculty members.
Prerequisites: Permission of instructor and full-time graduate student status
Summer, 0 credits

Oral Biology and Pathology (HBO)

Chairperson: Israel Kleinberg
Westchester Hall, Room 196 (516)632-8923

Graduate Studies Director: Jerry Pollock
Westchester Hall, Room 101

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 Studies 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 the University central computer facility.

The University libraries maintain 1,500,000 bound volumes, 2,300,000 publications in microformat, and subscribe to approximately 13,300 periodicals and serial titles. Excellent collections are available in the Biology and Chemistry libraries. The Health Sciences Library contains 213,000 volumes and subscribes to 4,300 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 (GRE).

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. To do this, 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 defends 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 Associate 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 autoradiographic, freeze fracture and cytochemical techniques to determine the role of the fibroblast in collagen fibrillogenesis and regeneration of periodontal ligament fibers; the fibroblast in periodontitis lesions; odontogenesis and enamel maturation.

Golub, Lorne, M., Professor. D.M.D., 1963, University of Manitoba, Canada; M.Sc., 1965, University of Manitoba: Synthesis maturation and degradation of collagen in oral tissues; effect of inflammation on diabetes and collagen metabolism and on the flow, cellular and chemical constituents of gingival fluid and relevance to diagnosis and management of the periodontal patient.

Gwinnett, John A., Professor. B.D.S., 1959, University of Birmingham, England; Ph.D., 1964, University of Bristol, England: Scanning electron and light optical microscopy of hard and soft dental tissue; dental biomaterials in the restoration of teeth; acid-etch resin technique in the bonding and debonding of orthodontic brackets; analysis of ancient teeth.

Kaufman, Hershell W., Associate Professor, D.M.D., 1963, University of Manitoba, Canada; Ph.D., 1967, University of Manitoba: Role of phytic acid and its inositol phosphate derivatives in protection against dental caries and in inhibition of bone resorption in organ cultures; quantitation of carious lesion formation by contact microradiography.

Kleinberg, Israel, Professor and Chairperson. D.D.S., 1952, University of Toronto, Canada; Ph.D., 1958, University of Newcastle, England: Identification of peptides and salivary factors involved in the growth and metabolism of oral mixed bacterial populations; pharmaceutical application of salivary components in the control of dental caries and oral odor; mechanisms of dental plaque formation; new oral diagnostic techniques.

McNamara, Thomas F., 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 Studies 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.
Prerequisites: Oral Biology and Pathology or its equivalent and permission of instructor
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 environmental relationships of the bacterial systems formed on and in association with the oral hard and soft tissues. Specific and mixed bacterial populations and their role in oral disease will be dealt with.
Prerequisites: Oral Biology 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.
Prerequisites: 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.
Prerequisites: Undergraduate degree in basic science and permission of instructor
Fall and spring, 3 credits each semester

HBO 590 Research Projects in Oral Biology and Pathology
Individual laboratory projects closely supervised by faculty members to be carried out in their research laboratories.
Prerequisite: Student must be enrolled in a master's or doctoral program
Fall and spring, 3 credits each semester

HBO 599 Graduate Research
Original investigations undertaken with the supervision of a faculty member.
Prerequisite: Permission of instructor
Fall and spring, 1-12 credits each semester

HBO 690 Oral Biology and Pathology Seminars
Research seminars by students, staff and visiting scientists.
Prerequisite: Permission of instructor
Fall and spring, 1 credit each semester, repetitive

HBO 694 Dissertation Research in Oral Biology and Pathology
Original investigation undertaken with the supervision of a member of the staff.
Prerequisite: Permission of thesis advisor
Fall and spring, 1-12 credits each semester

HBO 695 Oral Biology and Pathology Teaching Practicum
Practice instruction in the teaching of oral biology and pathology at the undergraduate level carried out under faculty orientation and supervision.
Prerequisite: Permission of instructor
Fall and spring, 1-4 credits each semester

Pathology

(HBP)

Chairperson: Frederick Miller
Health Sciences Center, T-9, Room 140 (516)444-3000

Graduate Studies Director: Gail S. Habicht
Health Sciences Center, T-9, Room 125 (516)444-3030

The Department of Pathology offers a full graduate track in Experimental Pathology leading to the Ph.D. degree in Basic Health Sciences. 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 Studies Director, Dr. Gail S. Habicht.

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 courses 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 (GRE) 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 deficiencies 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 Mammalian Physiology
4. HBA 533: Basic Medical Genetics
5. HBP 531: General Pathology
6. HBM 531: Medical Microbiology
7. A tutorial in Gross Anatomy of the Human Body
8. BEE 532: Biometry
9. An advanced level Biochemistry course

Courses 1 through 7 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 Studies 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 and third years 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 research 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 defense committee and a seminar before the entire faculty and graduate students are required before the Ph.D. degree is awarded.

Faculty

Anderson, Steven M., Assistant Professor. Ph.D., 1981, Rockefeller University: Effect of src on differentiating cell populations. transformation of hematopoietic cells, retroviruses.

Benach, Jorge, Associate Professor.[1] Ph.D., 1972, Rutgers University: Infectious disease immunology.

Chanana Arjun D., Research Professor.[2] M.D., 1955, University of Rajputana, India; S.M.S., Medical College, Jaipur, India: Hematopoiesis; pulmonary pathobiology.

Coller, Barry S., Professor.[3] M.D., 1970, New York University: Coagulation; hematology.

Deutsch, Dale, Assistant Professor. Ph.D., 1972, Purdue University: Neurobiochemistry; effect of drug abuse on brain biochemistry.

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.

Furie, Martha B., Assistant Professor. Ph.D., 1980, Rockefeller University: Molecular basis of cell-cell and cell-substrate interactions.

Galanakis, Dennis, Associate Professor. M.D., 1962, University of Saskatchewan, Canada: Biochemistry; metabolism and physiology of fibrinogen in health and disease.

Ghebrehiwet, Berhane, Associate Professor.[3] 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.[3] M.D., 1970, New York University: Amyloidosis; amyloid proteins.

Habicht, Gail S., Associate Professor and Graduate Studies Director. 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., Research Professor.[2] D.V.M., Ph.D., 1964, University of Minnesota: Immunology; responses of gastrointestinal tract to environmental pollutants.

Key, Marc, Assistant Professor.[4] Ph.D., 1979, Medical University of South Carolina: Immunotherapy of cancer.

Lane, Bernard P., Professor. M.D., 1963, New York University: Ultrastructural pathology; differentiation; carcinogenesis.

Little, Brian, Assistant Professor. M.D., 1973, Ph.D., 1977, University of Vermont: Central nervous system and skeletal muscle RNA metabolism; neuromuscular disease.

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.

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, Professor. M.D., 1967, State University of New York, Downstate Medical Center: Neuropathology; immune disease of the nervous system.

Quigley, James P., Professor. Ph.D., 1969, The Johns Hopkins University: Membrane function, cell transformation and proteolytic enzymes.

Rapaport, Felix, Professor.[4] 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.

Thomas, Lewis, University Professor. M.D., 1937, Harvard University: Transplantation biology.

Tseng, Linda, Associate Professor.[6] Ph.D., 1968, University of North Dakota: Reproductive endocrinology; steroid biochemistry and molecular biology.

Number of teaching, graduate and research assistants, fall 1985: 13

[1] *N.Y. State Department of Health*
[2] *Brookhaven National Laboratory*
[3] *Joint appointment, Department of Medicine*
[4] *Joint appointment, Department of Surgery*
[5] *Joint appointment, Department of Biochemistry*
[6] *Joint appointment, Department of Obstetrics and Gynecology.*

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 Medical 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 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 hr/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 561 Electron Microscopy for Experimental Pathologists
Use of the electron microscope (EM), alone and in conjunction with other methodologies in studies of biological dysfunction. Special techniques include histochemistry, enzyme histochemistry, immunohistochemistry, diffraction, stereo-EM and scanning EM. Design of protocols, preparation and interpretation of data.
Prerequisite: Permission of instructor
Fall and spring semesters, 2-6 credits per semester

HBP 562 Histochemistry
Theoretical basis of histochemical techniques (enzyme histochemistry, autoradiography, cytophotometry, immunohistocytochemistry) as applied to the analysis of chemical components of cells and tissues.
Prerequisites: HBP 533 and permission of instructor
Fall, 2 credits

HBP 563 Histochemistry Lab
Application of histochemical techniques (enzyme histochemistry, radioautography, cytophotometry, electron histochemistry and immunohistochemistry) to the analysis of chemical components of cells and tissues.
Prerequisites: HBP 532 or 533 and permission of instructor
Fall, alternate years, 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 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 by students, staff and visiting scientists.
Prerequisites: Permission of instructor; open only to pathology graduate students
Fall and spring, 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.
Prerequisite: Permission of instructor
Fall and spring, 1-12 credits per semester

HBP 694 Thesis Research in Pathology
Original investigation under the supervision of a staff member.
Prerequisite: Permission of instructor
Fall and spring, variable and repetitive credit

HBP 695 Teaching Practicum in Pathology
Practice instructions in the teaching of pathology carried out under faculty orientation and supervision.
Prerequisite: Permission of instructor
Fall and spring, repetitive, 1-4 credits per semester

Pharmacological Sciences

(HBH)

Chairperson: Arthur P. Grollman
Health Sciences Center, T-7, Room 140 (516)444-3080

Graduate Studies Director: Moises Eisenberg
Health Sciences Center, T-7, Room 120 (516)444-3064

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 pharmacological 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 Studies Director, Moises Eisenberg.

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 5,000 square feet in the Chemistry 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, 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. All laboratories in pharmacological sciences are equipped with IBM personal computers, which are networked. These computers serve everyday laboratory operations, on-line processing, DNA sequence analysis, literature search and retrieval functions and word processing; all are available to graduate trainees. More sophisticated computing and graphics capabilities are provided by department 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 (GRE) General Test 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 (1986) is $8,500.

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

Bednar, Rodney, Assistant Professor. Ph.D., 1982, University of Delaware: Mechanisms of enzyme action; affinity labeling and suicide enzyme inactivators as probes of structure and function of enzymes; rational design of drugs.

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., 1979, University of Connecticut: Role of cyclic nucleotides, especially cyclic GMP, in the regulation of biological function.

Cohen, Seymour S., Professor Emeritus. Ph.D., 1941. Columbia University: Biochemistry of polyamines and nucleotide analogs; biochemistry of virus multiplication.

Eisenberg, Moises, Associate Professor and Graduate Studies Director. 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, The Johns Hopkins University: Mechanisms of action of antitumor chemical carcinogenesis and mutagenesis.

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, M.D., The 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; enzymology and biology of plasminogen activators.

Takeshita, Masaru, Research Associate Professor. Ph.D., 1960, Tokyo Kyoiku University, Japan: Mechanism of action of antitumor agents on DNA and chemical mutagenesis.

Williams, David L., Professor. 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 Western Reserve University: Role of metals in gene expression; mechanism of action of antitumor drugs; mechanism of induction of metallothioneins.

Number of teaching, graduate and research assistants, fall 1985: 25

[1] *Joint appointment, Department of Medicine*
[2] *Joint appointment, Department of Chemistry*

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 Clinical Pharmacology
A series of selected topics of clinical applications of drug therapy.
Prerequisite: HBH 531 or equivalent
3 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, even years, 3 credits

HBH 543 Principles of Toxicology
An examination of basic concepts of modern toxicology. Emphasis on biochemistry and pathology of toxicants. Topics discussed include 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, odd years, 3 credits

HBH 545 Biochemical 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 molecular 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 686 Minicourse: Advanced Seminars in Pharmacological Sciences
A series of five to six lectures by members of the Stony Brook faculty in conjunction with distinguished outside speakers on topics of current importance in pharmacology and related areas of biochemistry, molecular biology and cell biology.
Yearly, 1 credit

Physiology and Biophysics (HBY)

Chairperson: Simon J. Pilkis
Health Sciences Center, T-6, Room 140 (516)444-2287

Graduate Studies Director
Health Sciences Center

The Department of Physiology and Biophysics offers a program of study leading to the degree of Doctor of Philosophy in basic health sciences. Biochemistry, molecular biology, biophysics and neurobiology are the principle areas of teaching and research specialization. The department's focus of interest is in three general areas: 1) hormonal regulation of cell function and metabolism, with special emphasis on intercellular and intracellular signalling mechanisms; 2) biophysical studies of membrane; 3) cellular neurophysiology and neurobiology. Studies are conducted at the molecular, sub-cellular, cellular, organ and intact animal levels.

Faculty members 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. 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. The requirements are flexible and can be adapted to the individual's preference and needs. Close tutorial contact between the individual student and the faculty is regarded as the most important feature of the educational program. Additional information about department requirements and programs can be obtained by writing to the Graduate Studies Director.

Facilities

The Department of Physiology and Biophysics is well equipped with major research instrumentation for physiological, metabolic and biochemical studies: scintillation counters for radioisotope work, ultracentrifuges, an amino acid analyzer, a gas phase protein sequencer, instrumentation for measuring ORD and CD, plus a wide variety of chromatographic, electrophoretic, spectrophotometric, and electronic equipment. The department has a fully equipped cell and molecular biology core facility which allows students to engage in studies involving RNA-DNA recombinant technology. A computer center is also located in the department. Also available in Health Sciences Center core facilities are a DNA synthesizer, peptide synthesizer, mass spectrophotometer and a laboratory for chemical synthesis of low molecular weight compounds. NMR instrumentation is also available through collaboration with other departments. Department faculty members are associated with a Health Sciences Center diabetes and metabolism group and have collaborative arrangements with other basic science and clinical departments.

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 (GRE) 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., 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., Associate Professor.[1] Ph.D., 1976, University of Virginia: Central nervous system control of cardiovascular function.

Clausen, Chris, Associate 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.

Datyner, Nicholas B., Research Assistant Professor. Ph.D., 1981, University of New South Wales, Australia: Cardiac electrophysiology.

El-Maghrabi, Raafat, Research Assistant Professor. Ph.D., 1978, Wake Forest University: Enzyme regulation, hormonal control of metabolism.

Elzinga, Marshall, Professor.[3] Ph.D., 1964, University of Illinois, Urbana: Muscle physiology and biochemistry.

Fenstermacher, Joseph D., Professor.[4] Ph.D., 1964. University of Minnesota: Blood-brain barrier.

Hurewitz, Adam, Assistant Professor.[2] M.D., 1973. New York Medical College: Respiratory physiology.

Johnson, Roger A., Professor. Ph.D., 1968, University of Southern California: Mechanism of hormone action, regulation of membrane-bound enzymes.

Levy, Harvey M., Professor. Ph.D., 1955, University of California, Los Angeles: Muscle physiology and biochemistry.

Mathias, Richard T., Professor. Ph.D., 1975, University of California, Los Angeles: Electrophysiology of cardiac muscle, volume regulation in the lens.

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., Associate Professor. Ph.D., 1976, University of Southern California: Renal physiology.

Pilkis, Simon J., Professor and Chairperson. M.D., 1971; Ph.D., 1969; University of Chicago: Mechanism of hormone action; enzymology, protein structure and function.

Sampson, Michael, Assistant Professor.[2] M.D.C.M. 1974, McGill University: Respiratory physiology.

Scarpelli, Emile M., Professor.[5] M.D., 1959; Ph.D., 1962; Duke University: Pediatric pulmonary 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.

Stein, Leonard A., Assistant Professor.[2] M.D., 1974; Ph.D. 1983; University of Pennsylvania: Muscle physiology and biochemistry.

Van der Kloot, William G., Professor. Ph.D., 1952, Harvard University: Cellular neurophysiology.

Number of teaching, graduate and research assistants, fall 1985: 12

[1] *Joint appointment with the Department of Neurobiology and Behavior*
[2] *Joint appointment with the Department of Medicine*
[3] *Joint appointment with Brookhaven National Laboratory, Upton, N.Y.*
[4] *Joint appointment with the Department of Neurological Surgery*
[5] *Joint appointment with the Department of Pediatrics*

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 circulatory, respiratory, gastrointestinal, renal, encocrine and nervous systems.
Prerequisite: 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 chemosmotic 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.
Prerequisites: HBY 531, permission of instructor
Spring, odd years, 3 credits

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

Directories and Maps

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 370,000 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 service personnel, and personal enrichment for more mature persons.

State University's research contributions are helping to solve some of modern society's most urgent problems. It was a State University scientist who first warned the world of potentially harmful mercury deposits in canned fish, and another who made the connection between automobile and industrial exhaust combining to cause changes in weather patterns. Other University researchers continue important studies in such wide-ranging areas as immunology, marine biology, sickle-cell anemia and organ transplantation.

More than 1,000 public service activities are currently being pursued on State University campuses. Examples of these efforts include special training courses for local government personnel, State Civil Service personnel and the unemployed, participation by campus personnel in joint community planning or project work, and campus-community arrangements for community use of campus facilities.

A distinguished faculty includes nationally and internationally recognized figures in all the major disciplines. Their efforts are recognized each year in the form of such prestigious awards as Fulbright-Hayes, Guggenheim and Danforth Fellowships.

The University offers a wide diversity of what are considered the more conventional career fields, such as business, engineering, medicine, teaching, literature, dairy farming, medical technology, accounting, social work, forestry and automotive technology. Additionally, its responsiveness to progress in all areas of learning and to tomorrow's developing societal needs has resulted in concentrations which include pollution, urban studies, computer science, immunology, preservation of national resources and microbiology.

SUNY programs for the educationally and economically disadvantaged have become models for delivering better learning opportunities to a once-forgotten segment of society. Educational Opportunity Centers offer high school equivalency and college preparatory courses to provide young people and adults with the opportunity to begin college or to learn marketable skills. In addition, campus-based Educational Opportunity Programs provide counseling, developmental education and financial aid to disadvantaged students in traditional degree programs.

Overall, at its EOC's, two-year colleges, four-year campuses and university and medical centers, the University offers 3600 academic programs. Degree opportunities range from two-year associate programs to doctoral studies offered at 12 senior campuses.

The 30 two-year community colleges operating under the program of State University play a unique role in the expansion of educational opportunity. They provide: local industry with trained technicians in a wide variety of occupational curriculums, and offer transfer options to students who wish to go on and earn advanced degrees.

The University passed a major milestone in 1985 when it graduated its one-millionth alumnus. The majority of SUNY graduates pursue 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

Health Science Center at Brooklyn
Health Science 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

* *The Health Sciences Centers at Buffalo and Stony Brook are operated under the administration of their respective University Centers.*

** *While authorized to offer such baccalaureate and master's degree programs as may be approved pursuant to the provisions of the Master Plan in addition to the associate degree, the Fashion Institute of Technology is financed and administered in the manner provided for community colleges.*

*** *These operate as "contract colleges" on the campuses of independent universities.*

Community Colleges

(Locally-sponsored, two-year colleges under the program of State University)

Adirondack Community College at Glens Falls
Broome Community College at Binghamton
Cayuga County Community College at Auburn
Clinton Community College at Plattsburgh
Columbia-Greene Community College at Hudson
Community College of the Finger Lakes at Canandaigua
Corning Community College at Corning
Dutchess Community College at Poughkeepsie
Erie Community College at Williamsville, Buffalo and Orchard Park
Fashion Institute of Technology at New York City**
Fulton-Montgomery Community College at Johnstown
Genesee Community College at Batavia
Herkimer County Community College at Herkimer
Hudson Valley Community College at Troy
Jamestown Community College at Jamestown
Jefferson Community College at Watertown
Mohawk Valley Community College at Utica
Monroe Community College at Rochester
Nassau Community College at Garden City
Niagara County Community College at Sanborn
North Country Community College at Saranac Lake
Onondaga Community College at Syracuse
Orange County Community College at Middletown
Rockland Community College at Suffern
Schenectady County Community College at Schenectady
Suffolk County Community College at Selden, Riverhead and Brentwood
Sullivan County Community College at Loch Sheldrake
Tompkins Cortland Community College at Dryden
Ulster County Community College at Stone Ridge
Westchester Community College at Valhalla

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STATE UNIVERSITY OF NEW YORK AT STONY BROOK

Members of the Council

Subject to powers of State University trustees defined by law, the operations and affairs of the State University at Stony Brook are supervised locally by a ten-member Council. Nine are appointed by the Governor; the tenth, a student member with all the rights and responsibilities of the other members, is elected by the student body. All positions listed are correct as of February 1, 1986.

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Central Islip

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All positions are correct as of July 1, 1986.

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Ceil Cleveland, M.A.
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Assistant Vice Provost (Admissions and records)

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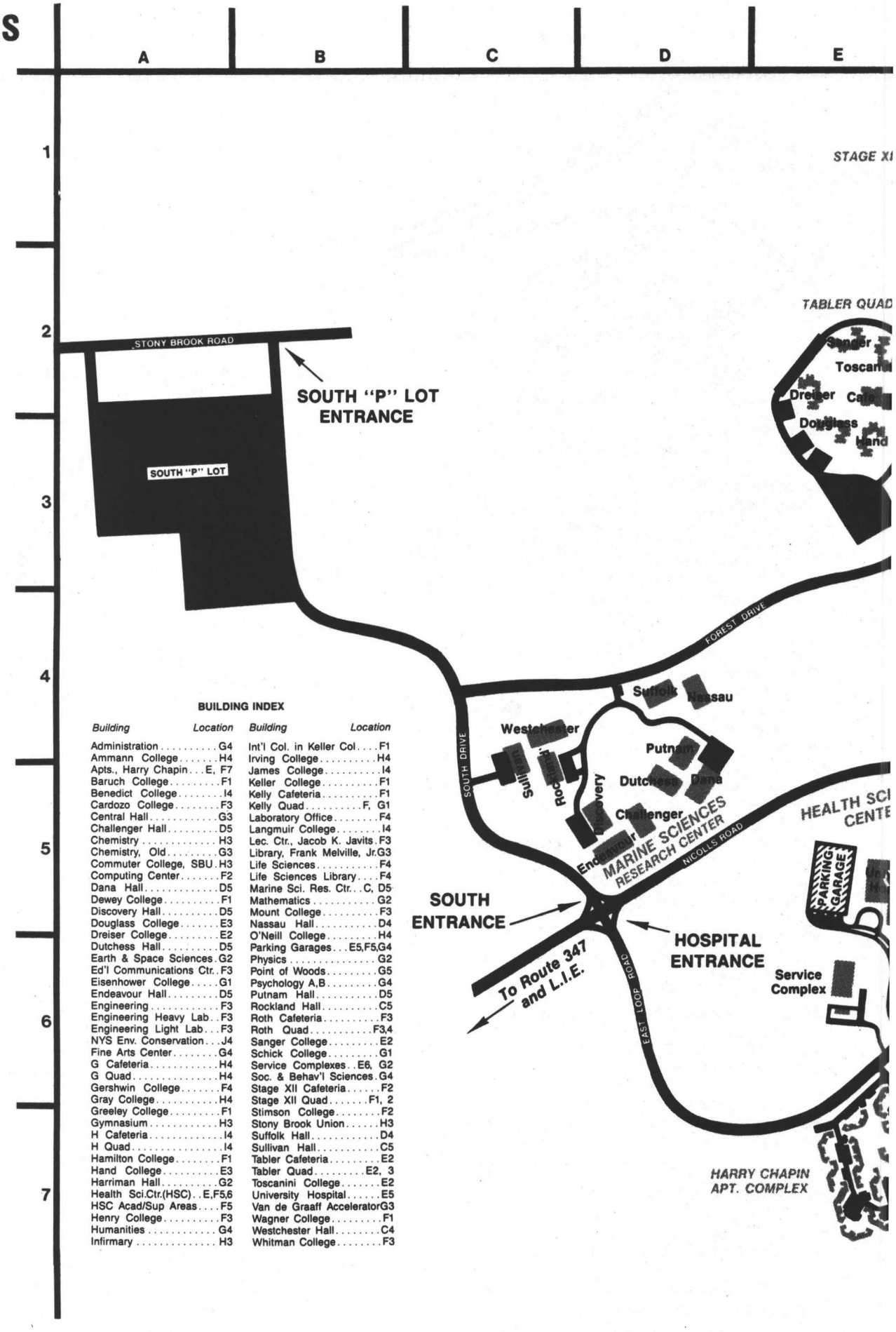
Assistant Vice Provost (Finance and budget, tuition waivers, fellowships and awards)

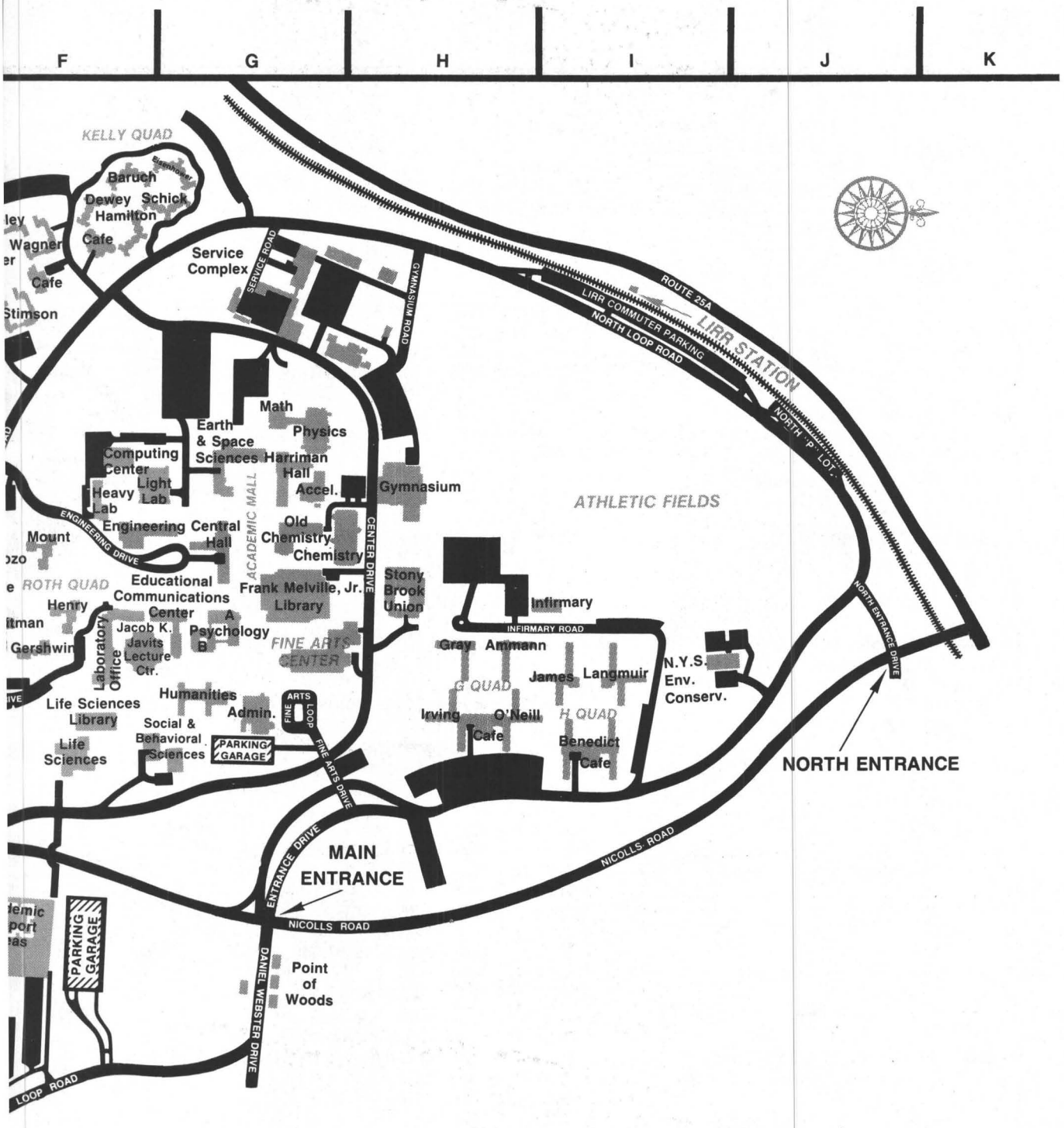
Phyllis A. Reed, M.A.
Assistant to the Vice Provost (Degree completion, theses and dissertations)

Campus Map



BUILDING INDEX

Building	Location	Building	Location
Administration	G4	Int'l Col. in Keller Col	F1
Ammann College	H4	Irving College	H4
Apts., Harry Chapin	E, F7	James College	I4
Baruch College	F1	Keller College	F1
Benedict College	I4	Kelly Cafeteria	F1
Cardozo College	F3	Kelly Quad	F, G1
Central Hall	G3	Laboratory Office	F4
Challenger Hall	D5	Langmuir College	I4
Chemistry	H3	Lec. Ctr., Jacob K. Javits	F3
Chemistry, Old	G3	Library, Frank Melville, Jr.	G3
Commuter College, SBU	H3	Life Sciences	F4
Computing Center	F2	Life Sciences Library	F4
Dana Hall	D5	Marine Sci. Res. Ctr.	C, D5
Dewey College	F1	Mathematics	G2
Discovery Hall	D5	Mount College	F3
Douglass College	E3	Nassau Hall	D4
Dreiser College	E2	O'Neill College	H4
Dutchess Hall	D5	Parking Garages	E5,F5,G4
Earth & Space Sciences	G2	Physics	G2
Ed'l Communications Ctr.	F3	Point of Woods	G5
Eisenhower College	G1	Psychology A,B	G4
Endeavour Hall	D5	Putnam Hall	D5
Engineering	F3	Rockland Hall	C5
Engineering Heavy Lab	F3	Roth Cafeteria	F3
Engineering Light Lab	F3	Roth Quad	F3,4
NYS Env. Conservation	J4	Sanger College	E2
Fine Arts Center	G4	Schick College	G1
G Cafeteria	H4	Service Complexes	E6, G2
G Quad	H4	Soc. & Behav'l Sciences	G4
Gershwin College	F4	Stage XII Cafeteria	F2
Gray College	H4	Stage XII Quad	F1, 2
Greeley College	F1	Stimson College	F2
Gymnasium	H3	Stony Brook Union	H3
H Cafeteria	I4	Suffolk Hall	D4
H Quad	I4	Sullivan Hall	C5
Hamilton College	F1	Tabler Cafeteria	E2
Hand College	E3	Tabler Quad	E2, 3
Harriman Hall	G2	Toscanini College	E2
Health Sci.Ctr.(HSC)	E,F5,6	University Hospital	E5
HSC Acad/Sup Areas	F5	Van de Graaff Accelerator	G3
Henry College	F3	Wagner College	F1
Humanities	G4	Westchester Hall	C4
Infirmary	H3	Whitman College	F3



Visitor Parking (Additional parking is available in most parking areas to visitors with special permits.)

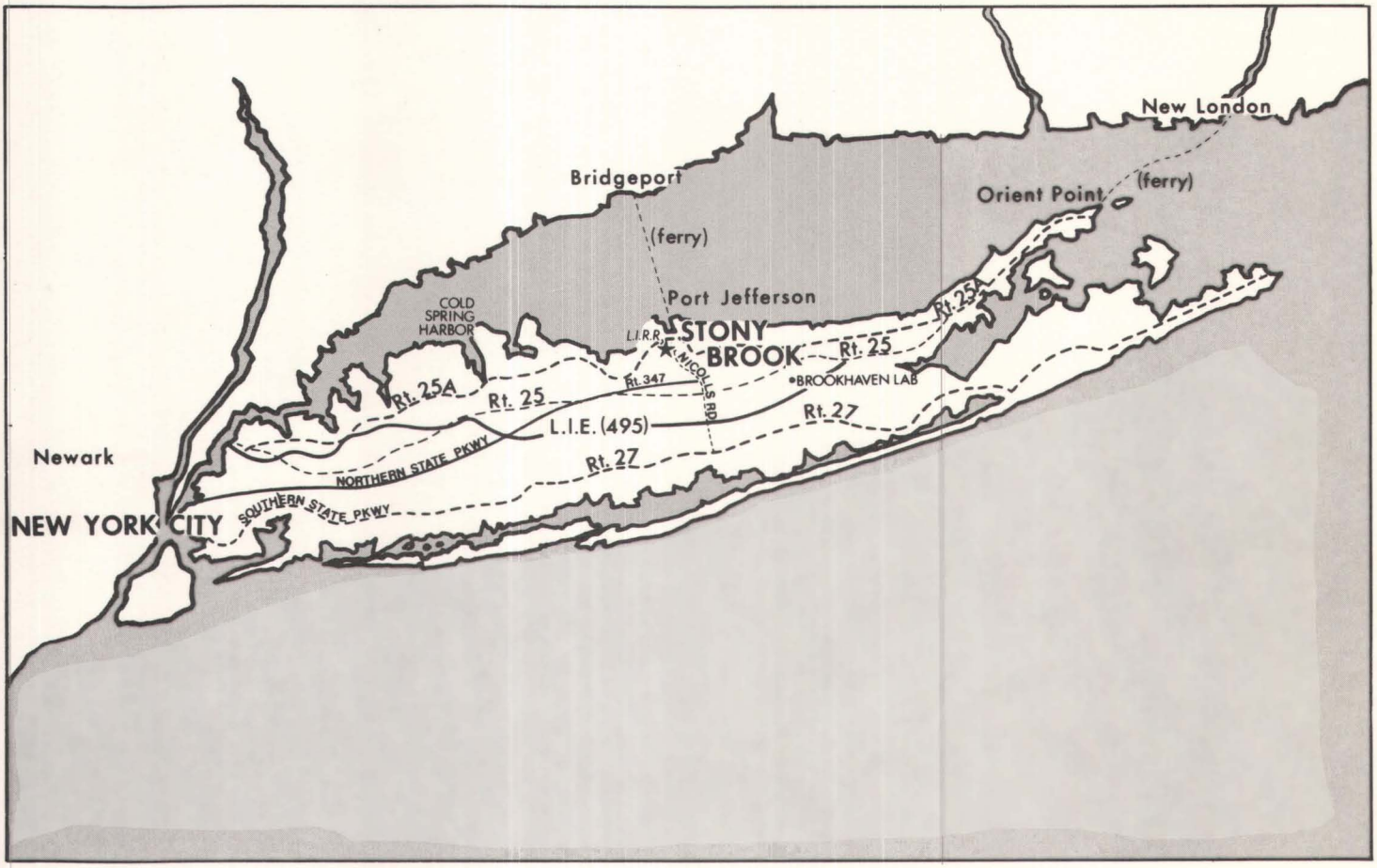
Free buses run regularly from North and South "P" Lots to the rest of the campus.

Parking for the disabled is available in most parking areas.

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

Directions to Stony Brook



BY CAR
Take the Long Island Expressway (Route 495) to Exit 62; follow Nicolls Road (Route 97) north for nine miles.

Ferry Connection
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 to Stony Brook. Cross tracks for free campus bus.

BY BUS
Call Suffolk County Transit (516-360-5700) for schedules, rates and routes for buses to campus from many local towns.

BY AIR
Land at Kennedy or LaGuardia Airport, 50 miles west of campus, or at Long Island MacArthur Airport (516-467-6161) 10 miles south of campus. MacArthur has limousine and taxi service to campus.

Graduate School
State University of New York at Stony Brook
Stony Brook, New York 11794
U.S.A.