2008-09 CATALOG

Bucknell
UNIVERSITY

Lewisburg, Pennsylvania 17837
www.bucknell.edu
03/08

Mission Statement

Bucknell University is a unique national university where liberal arts and professional programs complement each other. Bucknell educates men and women for a lifetime of critical thinking and strong leadership characterized by continued intellectual exploration, creativity, and imagination. A Bucknell education enables students to interact daily with faculty who exemplify a passion for learning and a dedication to teaching and scholarship. Bucknell fosters a residential, co-curricular environment in which students develop intellectual maturity, personal conviction, and strength of character, informed by a deep understanding of different cultures and diverse perspectives. Bucknell seeks to educate its students to serve the common good and to promote justice in ways sensitive to the moral and ethical dimensions of life.

Policy Statements

Bucknell University admits students without regard to race, national or ethnic origin, religion, disability, or gender to all the rights, privileges, programs, and activities generally accorded or made available to students at Bucknell, and does not discriminate on the basis of race, color, gender, sexual orientation, gender identity, age, religion, national or ethnic origin, marital status, veteran status, or disability in the administration of its educational policies, admissions policies, scholarships and loan programs, and athletic and other University-administered programs.

It complies fully with the prohibitions against discrimination on the basis of race and sex contained in Title VI of the Civil Rights Act of 1964 and Title IX of the Educational Amendments of 1972. In employment of both students and staff, Bucknell is an Affirmative Action and Equal Opportunity Employer. The Affirmative Action Officer, 209 Marts Hall (570-577-1149), is the designated coordinator for compliance with Commonwealth and federal regulations and requirements. Bucknell has designated a Title IX coordinator, adopted and disseminated a nondiscrimination policy and has put grievance procedures in place to address complaints of discrimination on the basis of sex in education programs and activities. The Title IX coordinator is Amanda Backus, associate athletic director, abackus@bucknell.edu.

Because enrollment limitations may require the exclusion of some qualified students from certain academic programs, the following policy has been adopted: Admission to the University, to a college, to a degree program, or to a major does not guarantee enrollment to any individual course, transfer from one college to another, or registration in any particular degree program or declaration of a particular major. Registration in or transfer from one degree program to another, or declaration of a major, is authorized only with the approval of the University through the academic deans. The University reserves the right to cancel or limit enrollment in any individual course.

Nothing in this *Catalog* may be considered as setting forth the terms of a contract between a student or prospective student and Bucknell University. The University reserves the right to modify the requirements for admission and graduation and the contents of this catalog at any time; to amend any regulation or policy affecting the student body; and to dismiss from the University any student if it is deemed by the University to be in its best interest or in the best interest of the student to do so.

Accreditations

Bucknell University is accredited by the Commission on Higher Education of the Middle States Association of Colleges and Schools, 3624 Market St., Philadelphia, PA 19104, 267-284-5000. The Commission on Higher Education is an institutional accrediting agency recognized by the U.S. Secretary of Education and the Commission on Recognition of Postsecondary Accreditation. In addition, Bucknell's bachelor of science curricula in chemical, civil, electrical, and mechanical engineering and in computer science and engineering are accredited by the Accrediting Board for Engineering and Technology, 111 Market Place, Suite 1050, Baltimore, MD 21202, 410-347-7700. The Accrediting Board for Engineering and Technology is a specialized accrediting agency recognized by the U.S. Department of Education and the Council for Higher Education Accreditation. The bachelor of science in computer science within the College of Arts and Sciences is accredited by the Computer Sciences Accreditation Board, Suite 209, Two Landmark Square, Stamford, CT 06901,

203-975-1117. The Computer Sciences Accreditation Board is a specialized accrediting agency recognized by the Council for Higher Education Accreditation and the Association of Specialized Professional Accreditors. The music curricula are accredited by the National Association of Schools of Music Commission on Accreditation, 11250 Roger Bacon Drive, Suite 21, Reston, VA 20190, 703-437-0700. The National Association of Schools of Music is a specialized accrediting agency recognized by the U.S. Department of Education and the Council on Higher Education Accreditation. The bachelor of science curriculum in chemistry is approved by the American Chemical Society, 1155 16th St., N.W., Washington, DC 20036, 800-227-5558. The department of education certification programs are approved by the Pennsylvania Department of Education, 333 Market St., Harrisburg, PA 17126, 717-787-2644.

Contacts *

For more information on particular aspects of Bucknell University, contact the people listed below at the phone number shown (area code 570). To reach departments not included on the list, call the main University number, 570-577-2000. All mail to Bucknell faculty and administrators may be addressed to Bucknell University, Lewisburg, PA 17837.

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* All faculty and staff listings are accurate as of the publication deadline for this catalog.

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UNIVERSITY CALENDAR 2008-09*

Summer Session 2008

June 9	Monday	Six-week session begins
July 18	Friday	Summer school ends

First Semester

August 22	Friday	New student orientation begins
August 25	Monday	Noon, First-year enrollment
August 26	Tuesday	Upperclass hold clearance
August 26	Tuesday	7:30 p.m., Annual convocation
August 27	Wednesday	8 a.m., First semester begins
September 1	Monday	Labor Day
September 26	Friday	Family Weekend begins
October 10	Friday	5 p.m., Fall recess begins
October 15	Wednesday	8 a.m., Fall recess ends
October 24	Friday	Homecoming Weekend begins
November 25	Tuesday	10 p.m., Thanksgiving recess begins
December 1	Monday	8 a.m., Thanksgiving recess ends
December 9	Tuesday	10 p.m., First semester ends
December 10	Wednesday	8 a.m., Reading period begins
December 11	Thursday	Final exam period begins
December 18	Thursday	Reading period and final examinations end

Second Semester

January 13	Tuesday	Undergraduate hold clearance
January 14	Wednesday	8 a.m., Second semester begins
March 6	Friday	5 p.m., Spring recess begins
March 16	Monday	8 a.m., Spring recess ends
April 28	Tuesday	10 p.m., Second semester ends
April 29	Wednesday	8 a.m., Reading period begins
April 30	Thursday	Final exam period begins
May 7	Thursday	Reading period and final examinations end
May 16	Saturday	Baccalaureate
May 17	Sunday	Commencement
May 25	Monday	Memorial Day
May 28	Thursday	Reunion Weekend begins

***Some events dates are subject to change; check Academic Calendar website to confirm dates: www. bucknell.edu/x6979.xml**

OVERVIEW OF BUCKNELL UNIVERSITY

Bucknell was established in 1846 as the University at Lewisburg, the nation's 100th college or university in order of founding. It was renamed in 1886 in honor of William Bucknell, a major benefactor. It has enrolled women since 1883 and, although founded by Pennsylvania Baptists especially to train teachers and missionaries, it always has been open to students and faculty of all religious faiths and it is nondenominational today.

Over the years the University has steadily evolved from a local, denominational institution to a highly visible national institution. The 3,400 undergraduates and 150 graduate students are drawn from nearly all the states and nearly 60 countries, including 15 percent who are students of color and 3 percent from abroad. Prospective undergraduate interest is such that only one third of the applicants can be admitted, and more than 70 percent of those who enroll are from the top one-tenth of their secondary school classes.

Among the institutions sharing the interests of Bucknell's applicants each year are most of the Ivy League universities, other prominent doctoral institutions such as Duke and Carnegie Mellon, and many of the finest liberal arts colleges, underscoring Bucknell's considerable stature in its 161st year.

The range of institutions with which observers align Bucknell bespeaks the University's distinctive institutional type. This type is decidedly undergraduate and collegiate, providing for personalized, liberal learning, yet it incorporates the curricular complexity and scope of significantly larger institutions.

Professional and preprofessional programs in the College of Engineering, music, education and management do more than coexist with the liberal arts and sciences. All of these programs operate with obvious excellence, and they often function synergistically to enhance the intellectual transformation of students that is Bucknell's *raison d'etre.*

The Bucknell model for higher education dates to the late 19th century and the earliest years of this century, when the University's fourth president, John Howard Harris, oversaw the institution of the engineering programs, the expansion of the education program, and the introduction of prelaw and premed programs.

Bucknell University awards bachelor of arts and bachelor of science degrees in more than 50 fields, including nine interdisciplinary programs – animal behavior, cell biology/biochemistry, comparative humanities, economics/mathematics, environmental studies, international relations, Latin American studies, neuroscience, and women's and gender studies. Approximately 80 percent of the students are enrolled in the College of Arts and Sciences and 20 percent in the College of Engineering. A small number of master's degrees are awarded in selected fields.

The undergraduate curriculum capitalizes on the strengths of Bucknell's entering students – the drive to succeed, a curiosity to understand, a desire to find meaning in daily life – while providing the foundation for a lifetime of learning. Requirements are structured to develop context – historical, cultural and geographic – for the study of nature and societies; the analytical tools and ability to reason; initiative and motivation to learn; and basic writing, quantification, and problem-solving skills.

Since students will be living and working in a world where intercultural competence and technology will demand broad perspective and transferable habits of thought, Bucknell

includes both independent and collaborative learning, as well as focused study in international and modern culture and issues, as cornerstones of the undergraduate experience. Nearly 42 percent of each graduating class has studied abroad in approved programs in Europe, the Middle East, Africa, Asia, South and Central America, Australia, New Zealand and Canada.

GREAT TEACHING AND OTHER ASSETS

Notwithstanding the variety of intellectual commitments and practices represented at Bucknell, the faculty aspire to be great teachers universally and single-mindedly. They practice a most direct, energetic and committed form of pedagogy, one result of which is a rich variety of close intellectual encounters between faculty and their students. Undergraduate research is emphasized in all areas of the curriculum, and it is made possible by the high level of the faculty's research and scholarship. Bucknell's faculty consists of more than 300 full-time members, nearly 97 percent with the Ph.D. or another terminal degree.

The faculty's strong relations with students have much to do with Bucknell's extraordinary graduation rates – 90 percent within five years – which annually rank among the highest few in the nation. Employment and graduate school placement figures are also very high, and Bucknell ranks 17th among private liberal arts colleges and universities for the number of its graduates receiving doctorates in the last decade.

Bucknell's additional assets include a $592 million endowment, an operating budget of $211 million, and a network of more than 47,000 alumni throughout the nation and the world. The 450-acre campus is among the most attractive in the country; most of its more than 100 buildings are described on pages 318-323. Of particular note are the handsome Weis Center for the Performing Arts (1988), the capacious Rooke Chemistry Building (1991) and adjoining Biology Building (also 1991), the highly regarded Ellen Clarke Bertrand Library (1951), and the state-of-the-art Breakiron Engineering Building (2004).

The University provides comprehensive residential and student activities programs to support the educational mission and to promote personal growth and responsibility. Eighty-nine percent of Bucknell students live on campus, enjoying options that include six residential colleges. More than 150 student organizations create a wide range of cocurricular and extracurricular opportunity in the arts, media, community service, religion, and other areas. An active Greek system involves about half of the eligible (non-first-year) students.

Bucknell's athletics program is particularly rich and distinctive. Approximately one-fifth of all students participate in 27 varsity sports at the Division I level. Bucknell is a member of the Patriot League, whose member institutions share a commitment to the primacy of the academic experience. Bucknell has captured the Patriot League's all-sports championship in 13 of the 17 years contested, but is equally proud that its graduation rate for athletes – 93 percent in the latest four-year average – is annually among the highest in the nation. In 2002, Bucknell led all NCAA divisions with a perfect 100 percent graduation rate of its student-athletes.

The campus is bordered by the Susquehanna River and Lewisburg, a historic small town in scenic central Pennsylvania. Most of the mid-Atlantic region's major cities are within three- or four-hour drives, including New York, Philadelphia, Baltimore, Washington, and

Pittsburgh, and the University uses their resources on a regular basis. Still, the day-to-day life of faculty and students is clearly nonurban and nonsuburban, and the walk from downtown to the University among stately 19th-century homes, in the light of the borough's signature street lamps, evokes the sense of an earlier, calmer America. Lewisburg also is ranked among the nation's "most livable" small towns, on the basis of key resources such as health care, safety, and the economic base.

COLLEGE OF ARTS AND SCIENCES CURRICULA

The College of Arts and Sciences offers programs of study leading to five degrees: the bachelor of arts, the bachelor of science, the bachelor of science in business administration, the bachelor of science in education, and the bachelor of music. The programs are designed to carry out the educational objectives of the University through courses in the humanities, the social sciences, the natural sciences, and mathematics.

The curricula of the college are primarily organized around the several departments of instruction, each of which is based in turn upon one of the major disciplinary fields of inquiry traditionally recognized in the wider world of higher education, both in the United States and abroad. In each of its varied and diverse parts, the college offers challenging opportunities for general education and for intensive academic exploration, for breadth and for depth. Consequently, candidates for degrees in arts and sciences, regardless of the specific degree or major, are required to demonstrate high capability in general as well as in specialized study.

Although students will satisfy the requirements in different ways, each student must devise a program in accord with the Common Learning Agenda.

THE COMMON LEARNING AGENDA

Education for the 21st century should have as its goal the liberation of students to be critical and complex thinkers, lifelong learners, and free and original decision makers who have learned compassion, civility, and a concern for social justice as part of their educational maturation. The Common Learning Agenda was developed by the College of Arts and Sciences to give students the opportunity to acquire the education they will need in order to live and work successfully in the 21st century. The various components of the Common Learning Agenda help in different ways to realize this goal, but they all address a concern for how students learn as well as for what they learn. The six components are: (1) Foundation Seminar, (2) Disciplinary Breadth, (3) Broadened Perspectives for the 21st Century, (4) Disciplinary Depth, (5) Capstone Experience, and (6) Writing Competency.

1. FOUNDATION SEMINAR

Each first-year student will enroll in a small seminar of about 15 students, usually in the fall semester. Foundation Seminars are offered by many different faculty and focus on a wide variety of subjects. Whatever the topics, they are designed to cultivate the attitudes, skills, and knowledge necessary for students to benefit maximally from a Bucknell education and to negotiate the complexities of the modern world. The seminars will stress the following: active, independent learning; collaborative learning; development of students' capacity for analysis, reflection, judgment, and creativity; multiple perspectives; and development of skills students need in order to engage in intellectual endeavors at Bucknell and beyond. These courses will address foundational skills in reading, writing, listening, and speaking and also develop students' ability to use the library effectively and to use computers (e.g., word processing, simulations, use of a database, or analysis of data).

For bachelor of arts students, the seminar instructor serves as academic adviser for the first two years; for students in the various bachelor of science and bachelor of music degrees, the seminar instructor will serve in an informal advisory capacity, and another faculty member in the student's degree program will serve as the official adviser for curricular requirements for the major.

2. DISCIPLINARY BREADTH

The general purpose of a distribution program is the broadening of intellectual and experiential horizons. Such results can be achieved by means of formal study in the three major divisions of the College of Arts and Sciences: humanities, social sciences, natural sciences and mathematics. Students are required to distribute their courses of study throughout these major divisions in order to achieve disciplinary breadth.

In planning an undergraduate program, students should choose some courses that will introduce them to kinds of study, disciplines, cultures, and issues that are new to them or with which they have had little previous experience. They should seek courses that will enlarge their capacity to make informed and responsible decisions concerning "life interests": that is, their values – social, moral, political, and religious; their prospects for a career; and their knowledge of themselves.

It also is wise to select some courses that will take advantage of previous study. Particularly in language and mathematics, continuity is most important, and the student who is either interested in such subjects, or who will need them as prerequisites for future work, should continue these studies without interruption by taking appropriate courses during the first year. Entering students who continue a foreign language are placed in appropriate courses according to their preparation and proficiency.

In seeking to achieve disciplinary breadth, students will be guided in their selection of courses by the following divisional requirements and objectives. (Note that the humanities and the social science requirements may be fulfilled by any courses in the appropriate division; in the natural sciences, two of the courses must have laboratories.) These requirements should be completed by the end of the fourth semester unless the student's degree program specifies a different timetable.

a. Humanities – four courses (no more than two in one department)

The humanities include: Arabic, art, art history, Chinese, classics, dance, East Asian studies, English, French, German, Greek, Hebrew, history, humanities, Italian, Japanese, Latin, Latin American studies, music, philosophy, religion, Russian, Spanish, theatre, some environmental studies, and women's and gender studies.

The fundamental purpose of humanistic study is the development of the critical and creative faculties of each student. Study in the humanities allows students to explore their individual and collective identities, their positioning in history, and their relations to the various environments upon which human life depends. Courses in art, classics, creative writing, dance, music, history, languages, literature, philosophy, religion, and theatre allow students to discover and develop their creative and critical abilities. These disciplines also provide an opportunity to study texts, artifacts, and other products of human cultures in order to understand those objects as well as the peoples and cultures that produce them.

b. Social Sciences – two courses (in two different disciplines – that is, in two different departments, with the exception that sociology and anthropology count as separate disciplines)

The social sciences include: anthropology, economics, education, some environmental studies, some geography, international relations, linguistics, management, political science, psychology, sociology, some women's and gender studies.

The social sciences study the myriad dimensions of human behavior and human relationships from a variety of disciplinary and interdisciplinary perspectives. An adequate understanding of individuals, organizations, and societies requires careful research and analysis. In addition, through social science analysis we can begin to understand the profound social problems faced by humankind in the past, present, and future. Different branches of the social sciences employ different methodologies and define their scope of inquiry differently as they seek to comprehend individual and social life and to develop policies and other means of intervention. Thus, in order to gain a broad understanding of social science analyses, each student should be exposed to the content and methodology of at least two social science disciplines.

c. Natural Sciences and Mathematics – three courses (specifically, two natural science laboratory courses and one other course in natural sciences, mathematics, or computer science.)

The natural sciences and mathematics include: astronomy, biology, chemistry, computer science, some environmental studies, some geography, geology, mathematics, physics.

The study of any discipline would be incomplete without first-hand experience working with and interpreting the fundamentals of that discipline. Just as literature courses must analyze original works, courses in the division of natural sciences and mathematics must engage students in actually doing mathematics and science in ways typical of these disciplines. In general, it is particularly important that they know and understand

a. how science does and does not work
b. the application of scientific and mathematical principles
c. the distinction between science and dogma, and
d. sufficient fundamentals to be able to communicate with other educated individuals about the wonders and beauty of our natural and theoretical worlds and to make informed decisions on issues affecting humans and their environment.

Laboratory courses reflect the principle that students most effectively gain their knowledge in the sciences through a hands-on approach. An additional course in mathematics or computer science or science (with or without lab) emphasizes the importance of continuing to develop math/science literacy to prepare for life in the 21st century.

3. BROADENED PERSPECTIVES FOR THE 21ST CENTURY

The world that our students will enter as they leave Bucknell University is characterized by long-standing human and social problems such as war, poverty, and family violence; technological and scientific advances that have saved lives and enhanced our daily living and at the same time created or exacerbated environmental problems; an increasingly diverse population; and above all, a very rapid rate of change that makes it hard to predict what challenges will face us in the future. The goal of this component of the Common Learning Agenda is to prepare students intellectually for life and work in the 21st century by focusing their attention on two dimensions of our changing world: the interdependence of our natural and fabricated worlds and human diversity of race, gender, ethnicity, and culture.

In seeking to achieve broadened perspectives, students will be guided in their selection of courses by the following requirements and objectives. These requirements may be completed at any time during the student's four years.

a. Perspectives on the Natural and Fabricated Worlds – one course (from a list of courses which is available on the Bucknell home page [www.bucknell.edu] under Course Information).

Through courses addressing these perspectives, students will come to understand the connections among the human, natural, and fabricated worlds. Courses meeting this requirement focus on the influence and impact of technology on society and environment or principles that help us to live harmoniously with the natural world. These courses deal with topics such as: operations of natural systems and the effects of human interactions with these systems; new developments in technology that may have profound environmental consequences and that also promise to change our social lives and the ways in which we understand ourselves; the history of human attempts to understand our role in the natural and fabricated worlds and the ways in which we have constructed our relationships, both of dominance and of interdependence, with these worlds.

b. Perspectives on Human Diversity – one course (from a list of courses which is available on the Bucknell home page [www.bucknell.edu] under Course Information).

Courses addressing these perspectives foster an appreciation for human differences grounded in knowledge of others, which is an essential precondition for tolerance and respect, values of central importance for our human community. Courses meeting this requirement focus on themes of human diversity within and across national borders. These courses treat such topics as: the meanings we attach to linguistic, physical, cultural, or social differences; the ways in which different societies have coped with racial or ethnic diversity; cultures or cultural products of countries or regions whose primary language is not English or developing countries or regions whose primary language is English; diversity along racial, ethnic, sexual orientation, and/or gender lines in the United States or in an international context.

4. DISCIPLINARY DEPTH

While the disciplinary breadth and broadened perspective requirements seek to provide exposure to the range of human and educational endeavors, specialized study allows the student to explore the methodology and scholarship of a specific field of study. As such, one is able to understand and appreciate the value of focus in a particular discipline, thereby more fully understanding and appreciating the value of sustained study and scholarship. In pursuing the disciplinary depth objective – through fulfillment of the requirements of a major – it is possible not only to begin to master a field of study but also to begin to build connections to the disciplinary breadth objectives of knowledge integration and multiple perspectives.

Majors may be pursued in either the bachelor of arts degree program or from among the several bachelor of science and professional degree programs offered by the College of Arts and Sciences. When a major is available in more than one degree program, the choice of degree will likely depend upon the student's overall educational objectives: those seeking to emphasize a broader grounding in the liberal arts may choose the bachelor of arts degree program; those seeking to emphasize more sustained study in the major field may choose one of the bachelor of science or professional degree programs. Regardless of the choice of degree program, however, students will have the opportunity to fulfill all of the objectives of a liberal education and of specialization and to prepare for future endeavors, including advanced study.

THE BACHELOR OF ARTS MAJORS

The bachelor of arts degree program provides both a minimal and a maximum number of courses to be studied in the major. Accordingly, in addition to meeting the College's Common Learning Agenda requirements and objectives, the student is encouraged, and has ample opportunity, to pursue electives which will supplement and further broaden the educational experience.

The end and aim of such an extended, and extensive, liberal studies education is the development and orientation of an intelligent and a responsible individual. The liberal studies are the starting point and constant preoccupation of men and women who are committed to the belief that knowledge is important for its own sake and that the pursuit of perfection is worth all the work that it requires. After college, students who have elected liberal studies may discover great practical advantage, for they have laid the foundations for an understanding of their cultural heritage, of the contemporary world, of the hierarchy of values, and of themselves. They also have learned much about their own abilities, their strengths, and their limitations.

For the student who has professional ambitions, and who therefore faces the prospect of spending from three to six years in specialized graduate study, the curriculum of liberal studies is invaluable. Graduate schools as well as training programs in industry are coming to expect a liberal education as a qualification for admission.

Liberal education is not incompatible with specialization. It is liberal education that gives a broader usefulness to specialization. Graduate and professional schools and employment training programs expect that specialized instruction be based on a liberal foundation. Because it establishes the conditions for development of an individual's potential, such a foundation becomes a means of achieving a higher degree of professional and technical competency. It stabilizes the balance of judgment and supports the resourcefulness and the creativity of the specialist.

The process of attaining the bachelor of arts degree serves in achieving the goals of a liberal education. Each student who is a candidate for this degree, with the assistance of a faculty adviser, is required to plan a personal program of study. It is obvious that the planning of such a program is itself a task of considerable difficulty and that it may well be the most demanding responsibility a student must face. When it is wisely carried out, it will represent a major achievement of the undergraduate years.

The major must be chosen no later than the second semester of the sophomore year. (Occasionally a student will undertake a double major, which entails meeting all obligations of each of the two fields selected.)

Three types of major programs are available:

The Established Departmental and Interdepartmental Majors

Students who wish to pursue a major in a discipline may do so by selecting from among many established programs: animal behavior, anthropology, art, art history, biology, chemistry, classics, comparative humanities, computer science, East Asian studies, economics, education, English, environmental studies, French, geography, geology, German, history, international relations, Latin American studies, mathematics, music, philosophy, physics, political science, psychology, religion, Russian, sociology, Spanish, theatre, and women's and gender studies. Ordinarily, students select a major during the fourth semester of study, at

which time the program of studies is established in consultation with an academic adviser and approved by the department or interdepartmental program chair concerned. A major normally requires a minimum of eight courses.

The Individual Interdepartmental Major
Students in the bachelor of arts curriculum who wish to investigate subjects, issues, or interests that cannot be served practically by the offerings of an established major may do so by proposing an interdepartmental major. This major shall consist of not fewer than eight or more than 12 courses chosen from among the offerings of two or more departments. This procedure will require also the completion for credit of a senior project to serve as a means of unifying the experience of the interdepartmental major. All proposals for individual interdepartmental majors are evaluated and approved by the Interdepartmental Major Committee. Any additional requirements or special adjustments in this program will be made by the Interdepartmental Major Committee in consultation with the student.

For an interdepartmental major, students should follow this procedure:

- In consultation with professors and advisers in the departments offering courses clearly related to their special interests, they should define the limits and the central purpose of a major program of interdepartmental study.
- Next, with the assistance of their advisers, they should prepare a formal proposal including (1) a statement of the reasons they wish to pursue an interdepartmental major, (2) a list of the courses that will constitute their program of study, and (3) a preliminary description of the senior project and the ways in which it will serve to unify and integrate the various courses of study. (A complete and detailed description must be submitted before preregistration in the spring of the student's junior year.) This formal application normally is due before spring break of the sophomore year.
- Having satisfied these obligations, students should obtain endorsements of their proposals from those members of the faculty with whom they have conferred and from the heads of the departments in which they plan to complete their major.
- Finally, they should be assured that their advisers will continue to assist them, and that one of them will serve as principal adviser or sponsor.

The College Major
Whereas most majors are based upon a field of study and primarily emphasize mastery of the subject, the college major does not require competence in only one academic discipline, but focuses instead upon the overall intellectual development of the individual student. In so doing, it offers maximum freedom in meeting educational interests, but at the same time imposes unusual responsibility for designing a coherent program.

Students who declare college majors must fulfill all disciplinary breadth requirements and attend to the disciplinary breadth objectives for the bachelor of arts degree. In cooperation with their advisers, an acceptable course of study is prepared. They also must complete a senior project which will integrate the diverse material they have studied. This project is planned not later than the final months of the junior year.

To register as a college major, students must prepare a detailed statement of educational goals, projecting a series of courses for the ensuing semester and providing a rationale for their program. This statement must be endorsed in writing by three faculty members, one of whom will initially become the student's adviser. At preregistration for each succeeding

semester, another proposal specifying courses for that term must be submitted to the adviser and the dean. Admission to the college major program after five semesters of study requires approval of the dean. Additional information about the college major may be obtained from the office of the dean of the College of Arts and Sciences.

Maximum Concentration
Within the 32 courses required for the bachelor of arts degree, a maximum of 12 courses may be taken in a single department. However, this 12-course limitation does not apply per se to the following departments: classics; foreign language programs; sociology and anthropology; or theatre and dance. In these departments the limitation applies to each of the programs in which a major is offered.

In those rare instances in which serious deficiency in a student's major program occurs, the student affected may submit a petition through the faculty adviser and department chair to the dean of the College of Arts and Sciences requesting that an exception be made to the 12-course limit. This right of petition is to be exercised only when a serious deficiency develops in a student's chosen major and after the seriousness of the deficiency has been assessed in the light of the student's demonstrated pursuit of a broad, liberal education. Evidence of such pursuit should include the use of elective courses, which go beyond the minimal requirements, to more fully realize the disciplinary breadth and the broadened perspective objectives (as noted in the discussion of those requirements). The petition must be recommended by a faculty adviser and endorsed by the student's department chair.

THE BACHELOR OF SCIENCE AND THE PROFESSIONAL DEGREE MAJORS
The bachelor of science and the professional degree programs require and permit greater specialization. Each of these programs has more extensive major and major-related requirements than do comparable majors in the bachelor of arts degree program. Unlike the bachelor of arts degree, each of these degree programs does not limit the number of electives which may be taken in the major beyond the minimal requirements.

Natural Sciences and Mathematics
The bachelor of science curricula are offered for those who seek an education founded upon the sciences but including instruction in the humanities and social sciences. These curricula, based on the requisites of scientific knowledge, provide a thorough preparation in the field of the student's major interest without neglecting complementary study in other areas. After completing one of these curricula, the student is qualified to pursue graduate or professional studies, or to enter research positions in industry. Bachelor of science students generally enter Bucknell having already selected a major.

The College of Arts and Sciences offers bachelor of science majors in animal behavior, biology, cell biology/biochemistry, chemistry, computer science, environmental geology, environmental studies, geology, mathematics, neuroscience, and physics.

Professional Degree Programs
The Bachelor of Science in Business Administration (B.S.B.A.), Bachelor of Science in Education (B.S.Ed.), and Bachelor of Music (B. Mus.) programs provide professional development that is strongly grounded in the larger context of a liberal education. Students in these programs, like those in other bachelor of science programs described above, devote a larger proportion of their studies to the major than candidates for the bachelor of arts degree.

Students pursuing the B.S.B.A. degree may major in management or accounting. A bachelor of management for engineers degree is available to students admitted to the five-year joint degree program leading to the joint degree, the bachelor of science in engineering degree (*in a specific engineering discipline*), and the bachelor of management for engineers degree. Students pursuing the B.S.Ed. degree may major in early childhood education or elementary education. The B. Mus. program offers majors in performance, music education, composition, and music history.

Pre-Health Professions Preparation
Satisfactory training for admission into schools of the medical sciences may be obtained through work toward either a bachelor of arts or a bachelor of science degree with a major in any department. Most graduate schools require a minimum of undergraduate work equivalent to one year each in biology, inorganic chemistry, organic chemistry, and physics. Students planning for such careers should consult the catalogs of the schools of their choice for specific requirements and suggested courses and register with the Pre-Health Professions Adviser at www.bucknell.edu/premed/ as soon as possible after enrollment in Bucknell.

Integrated B.S./M.S. Degrees
Undergraduate students who have completed three years at Bucknell University with a cumulative grade point average of at least 2.80, and who show aptitude for graduate study, may apply for admission to the integrated bachelor of science/master of science degree program available in the departments of biology, chemistry, or mathematics. This program permits selected students to complete all requirements for both degrees in five years.

5. CAPSTONE EXPERIENCE
Advanced courses address the need for depth in students' education; those in the major typically achieve depth partly through specialization as the student advances. Intellectual maturity also involves students understanding their field(s) of specialization in relation to other areas of study, understanding the broader issues for academic disciplines, applying what they know to real problems, and becoming prepared to make committed choices as participants in our complex world. Each student in the College of Arts and Sciences will satisfy the requirement of a Capstone course or an equivalent experience, usually in the senior year after all other general education requirements have been completed. The goal of the Capstone Experience is to provide opportunities for students to: (1) integrate knowledge within and across disciplines; (2) reflect and evaluate their entire educational experience; (3) make connections between the topic of focused study and real-world problems and questions that will continue to engage them after they leave Bucknell; and (4) interact with students who have different perspectives in order to foster a collaborative approach to learning and creative problem-solving that will carry over into their future lives.

Capstone courses may be interdisciplinary seminars open to all Arts and Sciences students or they may be offered by individual departments or groups of departments for their own majors. In all cases, they will be small seminars of approximately 15 students in order to ensure maximum participation and interaction among class members.

Students also may fulfill this requirement through independent research projects, internships or other similar activities, or student teaching, provided that they include interaction

with other students and are approved as meeting the goals for the Capstone Experience by the supervising faculty member.

The Capstone Experience requirement normally is fulfilled in either semester of the senior year. Although Capstone courses may sometimes be elected earlier, such courses will not count toward fulfilling the Capstone Experience requirement if taken earlier than the second semester of the junior year.

The Capstone Experience offers a unique opportunity within the Common Learning Agenda for realizing in a single academic endeavor the expectations of Bucknell's Mission Statement that "its students become both productive citizens and intellectually mature, self-aware individuals."

6. WRITING COMPETENCY

To satisfy the University writing requirement, a student must successfully complete three writing courses: one course designated W1 (which must be taken during the first year and which must be taken before the W2 courses) and two W2 courses (usually taken after the first year, but, in any case, at least one of which must be taken after the first year). Lists of W1 and W2 courses are available on the Bucknell home page (www.bucknell.edu) under Course Information.

Writing courses are designed to enhance the student's understanding of the writing process and to emphasize that writing is a way of learning as well as a communication skill. They may be taken in any department, including the student's major.

Common Learning Agenda Summary

1. FOUNDATION SEMINAR
One course required of all students in their first year. Foundation Seminars on appropriate topics may count toward the Broadened Perspectives requirement; or, in some cases, Foundation Seminars may count toward the Disciplinary Breadth requirement.

2. DISCIPLINARY BREADTH*

- **a. Humanities** – four courses (no more than two in one department)
- **b. Social Sciences** – two courses (in different departments)
- **c. Natural Sciences and Mathematics** – three courses (two laboratory sciences and one other course in natural sciences, mathematics, or computer science.)

3. BROADENED PERSPECTIVES FOR THE 21ST CENTURY**
Foundation Seminars and Disciplinary Breadth courses also may double-count as Broadened Perspectives courses if they address the relevant topics in a significant way.

- **a. Perspectives on the Natural and Fabricated Worlds** – one course
  Courses focus on the influence and impact of technology on society and the environment or principles that help us to live harmoniously with the natural world.
- **b. Perspectives on Human Diversity** – one course
  Courses address themes of human diversity either within or across national borders.

4. DISCIPLINARY DEPTH
A departmental, interdepartmental, or college major.

5. CAPSTONE EXPERIENCE
One integrative course or equivalent experience during the senior year.

6. WRITING COMPETENCY
One W1 and two W2 courses; also may count toward requirements for Foundation Seminar, Disciplinary Breadth, Broadened Perspectives, Disciplinary Depth, or Capstone requirements.

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*The Disciplinary Breadth requirements may be fulfilled by any courses in the appropriate division. (Note that two of the courses in natural sciences must have laboratories.)

**Courses which fulfill the Broadened Perspectives requirement are available on the Bucknell home page (www.bucknell.edu) under Course Information.

THE OPTIONAL MINOR

Minors are optional on both the part of faculty and students; no department or group of faculty members is required to offer a minor and no student can be required to elect a minor. All minors are open to all students, except where indicated, regardless of the student's degree programs.

Pursuit of a minor, whether departmental or interdisciplinary, may provide a student with more coherence and focus in choosing electives. This may well enhance the educational experience, particularly when the minor is chosen from a division other than that of the major or when the minor is interdisciplinary.

Optional minors are available to all regular undergraduate students in each of the areas listed below. Details of the requirements for each minor are listed on the indicated pages.

Regulations for Minors

A departmental minor consists of four, five, or six courses in a department. An interdepartmental minor consists of five courses, with none of the five being in the student's major department and no more than three of the five being in a single department. By faculty action, all minors are available to all students in the University.

The following stipulations pertain to a minor:

1. Courses may not be double-counted in majors and minors; however, corequisite or major-related courses outside the student's major department may be counted toward a minor. Note that students majoring in chemical engineering or biomedical engineering are not eligible for the chemical and biological studies minor nor for a minor in chemistry.
2. Courses which count toward a minor also may satisfy Common Learning Agenda requirements, except for the major.
3. Students in one degree program (e.g., bachelor of arts) may complete a minor in a department offering a different degree (e.g., bachelor of science).
4. The minors in chemical and biological studies and biomedical engineering are administered by the dean's office of the College of Engineering. Questions regarding these minors should be directed to that office.

Declaring a Minor

In order to declare, a minor a student should obtain a Declaration of Minor card from the registrar's office, fill it out, and have it signed by the chair of the department offering the minor or by the coordinator for the particular interdepartmental minor. The completed and signed card should be returned to the registrar's office no later than two weeks into the last semester of the senior year (i.e., September 7 for first semester graduates and February 1 for second semester graduates). Students planning on summer graduation must have the card filed by the preceding February 1. Late declarations will not be recorded on the student's permanent record.

DEPARTMENTS, PROGRAMS AND COURSES[1]

African Studies Minor

Coordinators: Michelle Johnson, Geoffrey Schneider

The interdepartmental African studies minor gives an understanding of Africa's rich heritage, diversity and role in the world today, and contributes an international focus to a liberal arts education. It consists of five courses chosen from the list below. Students must take at least three core courses, and they may choose any two other courses from the list below. If possible, at least one course should be related to the student's major. In consultation with the coordinator(s) of the minor, students may include an Africa-related course from the African American or Caribbean studies list. In general, there are no prerequisites for the courses on the African studies minor list.

Core Courses:

ANTH	235	Modern Africa
ANTH	329	Religions in Africa
CAPS	407	South Africa: Apartheid and After
ECON	235	African Economic Development
FREN	336	Francophone Africa
HIST	291	African History I
HIST	292	African History II
HIST	390	Seminar in African History
IREL	235	Modern Africa

Other African Studies Courses:

ANTH	227	Witchcraft and Politics
ANTH	228	Ritual, Myth, and Meaning
GEOG	236	Third World Development
HIST	290	European Imperialism and Colonialism
HIST	299	Topics in Non-western History (when appropriate)
SOCI	213	Race in Historical and Comparative Perspectives
SOCI	310	The Sociology of Developing Societies

Courses taken in summer or year-long programs in Africa will count towards the minor.

African American Studies Minor

Coordinators: Leslie Patrick, Joel Wade

The African American experience is directly and inextricably embedded in the history and culture of the United States. As an interdisciplinary field, African American studies is concerned with the systematic investigation of the history, culture, political economy, literature, art, and languages of people of African descent in the United States and their contributions to the United States and to the world. The African American studies minor is a way of educating all students about black experiences and developing in them an understanding and appreciation of the life and history of peoples of African ancestry

[1]for abbreviations and codes, see page 416.

in the United States and thus move toward a more comprehensive view of life and history in the United States generally.

By offering students opportunities to gain knowledge of this history and experience, an African American studies minor affirms black identity and heritage, fosters understanding, respect, and appreciation of diversity, and better prepares students for life in a multicultural society.

The interdisciplinary structure of the African American studies minor offers students directed toward the professions and graduate schools an opportunity to satisfy the increasingly rigorous expectations of admissions committees and prospective employers for a broad liberal arts perspective that complements specialized knowledge. African American studies provide a background for those considering careers in education, journalism, law, business management, public service, psychology, social work, and literature.

The interdepartmental minor in African American studies consists of five courses that must be taken in three different disciplines. A minimum of four courses must be selected from the following list. In consultation with the coordinators of the minor, students may count one course from either the African studies or Caribbean studies list.

ENGL	209	Modern American Literature – Contemporary African American Literature
ENGL	217	Studies in Dramatic Literature: 20th-century African American Drama and Theatre
ENGL	219	Studies in Selected American Authors: Art of Darkness
ENGL	221	African American Literature
ENGL	321	Seminar in African American Literature
HIST	121	Introduction to African American History I
HIST	122	Introduction to African American History II
HIST	218	African Americans and the American Revolution
HIST	219	Antebellum America: Slavery and Slave Narratives
HIST	223	Twentieth-century African American History: Eyes on the Prize
HIST	319	African American History Seminar
LING	210	Language and Race
PSYC	233	Black Psychology
PSYC	373	Psychology of Race and Gender
SOCI	213	Race in Historical and Comparative Perspectives
SOCI	280	Twentieth-Century Afro-Caribbean and African American Thought

American Studies Minor

Coordinator: Karen Morin

American studies focuses on the power and the mythology connected with the symbol of "America." When people use the term "America" or "American," they are often talking about something much more than the people, institutions, geography, culture, or history of the United States. They are talking (positively or negatively) about a symbol that may represent divine intervention in human affairs, or colonialist, imperialist, commercial oppression of others.

American studies is an examination of the construction of what citizens of the United States and of the world think or mean when they speak of "America" or "American." It takes as its focus an investigation of the meaning of "America" from the perspective of the peoples who consider themselves (or are considered by others to be) central, peripheral, or excluded by that term. Inclusive of but more than an area study, American studies is by definition inter- and cross-disciplinary, and minors are required to take courses offered by a variety of departments.

The American studies minor consists of five courses:

1. UNIV 229 Introduction to American Studies (or an approved replacement).
2. Any four courses from the following list.

ANTH	256	Native Americans, Past and Present
ECON	318	American Economic History
ECON	319	Economic History of Women in the U.S.
EDUC	350	Higher Education in the U.S.
ENGL	205	Early American Colonial Literature
ENGL	206	Early American National Literature
ENGL	207	American Romanticism
ENGL	208	American Realism and Naturalism
ENGL	209	Modern American Literature
ENGL	212	Contemporary American Literature
ENGL	213	Special Topics in American Literature
ENGL	214	Nineteenth-century American Women Writers
ENGL	215	Twentieth-century American Women Writers
ENGL	216	Studies in American Literary Genres
ENGL	219	Studies in Selected American Writers
ENGL	221	African American Literature
ENGL	301	Seminar in American Literature Topics
ENGL	302	Seminar in Selected American Writers
ENGL	305	Seminar in Early American Literature
ENGL	307	Seminar in 19th-century American Literature
ENGL	310	Seminar in Modern American Literature
ENGL	311	Seminar in Contemporary American Literature
ENGL	321	Seminar in African American Literature
ENST	207	American Environmental History
GEOG	226	Western Places, American Myths
HIST	111	Introduction to U.S. History I
HIST	112	Introduction to U.S. History II
HIST	113	Introduction to U.S. History III
HIST	121	Introduction to African American History I
HIST	122	Introduction to African American History II
HIST	211	Frontiers and Borderlands
HIST	212	American Environmental History
HIST	214	Topics in American History
HIST	217	American Colonial History
HIST	218	African Americans and the American Revolution
HIST	219	Antebellum America

HIST	220	American Civil War and Reconstruction
HIST	221	U.S. History: 1880s to 1930s
HIST	222	U.S. History: 1940s to the present
HIST	223	Twentieth-century African American History: Eyes on the Prize
HIST	225	Topics in American Political and Economic History
HIST	227	American Intellectual History I
HIST	228	American Intellectual History II
HIST	229	Topics in American Intellectual History
HIST	261	Twentieth-century Afro-Caribbean and African American Thought
HIST	270	Science and Technology in the U.S.
HIST	271	Medicine in the United States
HIST	310	U.S. History to 1865
HIST	311	U.S. History since 1865
HIST	312	Seminar in American Social History
HIST	313	The American West
HIST	319	African American History
HIST	320	American Labor History
HIST	321	American Immigrants
HIST	322	American Industrialization and Political Development
HIST	323	U.S. Foreign Policy in the 19th Century
MUSC	103	Jazz, Rock, and the Avant-Garde
PHIL	259	American Philosophy
POLS	140	American Politics
POLS	232	American Public Policy Analysis
POLS	237	American Political Parties
POLS	240	The American Congress
POLS	243	The American Presidency
POLS	244	American Judicial Politics
POLS	246	Race and American Politics
POLS	261	Twentieth-century American Legal Thought
POLS	263	Race and Ethnicity in American Legal Thought
POLS	271	American Foreign Policy
POLS	272	U.S. National Security Policy
POLS	287	U.S. and the Middle East
POLS	370	Seminar in American Politics
RELI	180	Introduction to Religion in America
RELI	280	Religion and Constitution Law
RELI	281	Religion and American Politics
RELI	315	Topics in American Religion
SOCI	140	American Culture and Society
SOCI	245	Remaking America: Latin American Immigration
SOCI	280	Twentieth-century Afro-Caribbean and African American Thought
SOCI	447	Seminar in Social Mobility
THEA	261	Inner Journey: Sam Shepard and American Theatre

Minors may not take more than two courses in any one department, and may take no more than two at the 100 level.

Any changes or substitutions must be approved by one of the program's coordinator.

Animal Behavior (ANBE)

Coordinating Committee: Warren G. Abrahamson, Elizabeth A. Capaldi (Acting Director), Donald C. Dearborn, Owen R. Floody, Peter G. Judge, Kevin P. Myers, DeeAnn Reeder

The program in animal behavior offers an interdisciplinary major that includes the subject matters of biology, chemistry, mathematics, physics, and psychology. The focus is directed toward understanding behavior and providing the student with a background uniting ecological, ethological, environmental, evolutionary, and experimental approaches to the study of animal life.

During the more than 30 years that Bucknell University has offered this major, animal behavior has been chosen by students seeking a broad background in the natural and social sciences, by those who become researchers, occasionally as a background for medicine or veterinary science, and because of the breadth of requirements, by persons filling a variety of positions in commerce, law, and public service.

The major may be pursued under either the bachelor of arts or the bachelor of science programs. The programs differ chiefly in the number of advanced science courses and laboratories. All students are encouraged to seek laboratory and field experiences in addition to required course work. The Bucknell laboratories, as well as opportunities abroad, are well suited to so complement the student's education. Research culminating in an honors thesis is especially recommended.

The **bachelor of arts major** consists of ANBE 266; any three from BIOL 205, BIOL 206, BIOL 207, or BIOL 208. (BIOL 205 and BIOL 208 are strongly recommended. Students should consult with an academic adviser in animal behavior to determine the most appropriate biology course selections given their academic goals); CHEM 211 and CHEM 212 or CHEM 201 and 202; PSYCH 203; PSYCH 250; either PSYC 215 or MATH 216; ANBE/PSYC 296; three animal behavior electives from the set consisting of BIOL 303, BIOL 313, ANBE/PSYC 317, BIOL 318, ANBE 319 or ANBE 320, ANBE/BIOL 321, BIOL 324, ANBE/BIOL 341, ANBE/BIOL 342, ANBE/BIOL 354, ANBE/BIOL 355, ANBE/BIOL 356, ANBE/BIOL 357, BIOL 358, ANBE/BIOL/PSYC 370, ANBE/BIOL 415, PSYC 324, PSYC/BIOL 343, ANBE 391, ANBE 399. With special permission, other PSYC/BIOL courses can be considered as electives.

The **bachelor of science major** consists of the same course credits noted above plus: all four biology core courses, rather than three; PHYS 211 and PHYS 212; MATH 201; either PSYC 290 or PSYC 293; and four electives rather than three.

The recommended sequence for the bachelor of science major is as follows:

First Year	**First Semester**: ANBE 266, BIOL 205, MATH 201 **Second Semester**: BIOL 206
Sophomore Year	**First Semester**: BIOL 207, either PSYC 215 or MATH 216, CHEM 211 or CHEM 201 **Second Semester**: BIOL 208, PSYC 203, PSYC 250, CHEM 212 or CHEM 202

Junior Year	**First Semester**: Research Methods course (PSYC 290, PSYC 293, or PSYC 296), one animal behavior elective; PHYS 211 **Second Semester**: Research methods course (PSYC 290, PSYC 293, or PSYC 296), one animal behavior elective, PHYS 212
Senior Year	**First Semester**: Animal behavior elective, research methods course (PSYC 290, 293, or PSYC 296 if not taken previously) **Second Semester:** Animal behavior elective

All students are advised to take the biology core courses in sequence, starting with BIOL 205. BIOL 208 serves as the prerequisite for most of the elective courses. A student's choice of the chemistry sequence (either CHEM 201-202 or CHEM 211-212) should be made in consultation with the student's academic adviser. Note that for both programs only one semester of independent research or honors credit may count toward the major.

Off campus study and research is encouraged. Students may enroll in any number of programs emphasizing animal life; recent students have studied in Africa, Australia, and New Zealand. Other programs in Europe, Asia, South and Central America also are appropriate. Students are advised to explore opportunities through the Office of International Education and to coordinate off-campus coursework in consultation with a faculty adviser. Many minors complement studies in animal behavior; students are encouraged to explore options within the humanities and social sciences in consultation with a faculty adviser.

Asterisks (*) indicate courses in which animal dissection **OR** experimentation with living animals may be involved in the course or laboratory.

266. Animal Behavior (I; 3, 0)
A survey of important theories, issues, and empirical techniques in the interdisciplinary field of animal behavior emphasizing both proximate and ultimate mechanisms and explanations for behavior. Crosslisted as BIOL 266 and PSYC 266.

296. Applied Research Methods Seminar in Animal Behavior (I or II; 0; 3*)
Laboratory and/or field research to accompany ANBE/BIOL/PSYC 266 (Animal Behavior) Prerequisite: PSYC 215 and prerequisite or corequisite ANBE/BIOL/PSYC 266. Crosslisted as PSYC 296.

317. Comparative Animal Cognition (I or II; 3, 0)
Advanced seminar in issues of nature/nurture, learning, development, and adaptation, in behaviors such as foraging, mating and communication in several species. Prerequisites: ANBE/BIOL/PSYC 266 and PSYC 203 or permission of the instructor. Crosslisted as PSYC 317.

319 and 320. Topics in Animal Behavior (I and II; R; 3, 0) Half to full course.
Occasional seminars on selected topics of current interest in animal behavior. Prerequisites: ANBE/BIOL/PSYC 266, junior or senior status and permission of the instructor.

321. Behavioral Ecology (I; 3, 0)
The consideration of behavioral adaptations to various ecological situations. Topics include habitat choice, foraging behavior, defenses against predation, mate choice, and brood care. Prerequisites: BIOL 208 and permission of the instructor. Crosslisted as BIOL 321.

341. Organic Evolution (AI; 4, 0)
The principles and mechanisms of evolution in plants and animals, covering population phenomena, speciation, life history strategies, adaptation, systematics, and biogeography. Prerequisites: BIOL 208 and permission of the instructor. Crosslisted as BIOL 341.

342. Neuroethology (I or II; 3, 0)
A course that integrates neurobiology and behavior in natural contexts. Emphasis on signal detection, recognition, discrimination, localization, orientation, and the control of complex acts. Neuronal and hormonal mechanisms, ontogeny and evolution of behavior will be considered. Prerequisites: BIOL 206, BIOL 208 and permission of the instructor. Crosslisted as BIOL 342.

354. Tropical Ecology (II; 3, 0)
Introduction to tropical ecology, including life history strategies of vertebrates and invertebrates, biodiversity management and conservation. Emphasis on class and individual projects, data collection, and journal keeping. Prerequisites: BIOL 208 and permission of the instructor. Crosslisted as BIOL 354.

355. Social Insects (I; 3, 3)
Evolution and genetics of social behavior, caste, communication in foraging and colony defense, queen and worker control over reproduction, social homeostasis, and population dynamics. Occasionally may be taught as a laboratory science. Prerequisites: BIOL 208 and permission of the instructor. Crosslisted as BIOL 355. Juniors and seniors only.

356. Plant-Animal Interactions (I; 3, 3)
The coevolution and ecology of plants and animals covering pollination ecology, seed dispersal, plant-herbivore interactions, and habitat constraints on the behavioral ecology of animals. Prerequisites: BIOL 122 or BIOL 208 and permission of the instructor. Crosslisted as BIOL 356.

357. Ornithology (II; 3, 3)
The biology of birds, including evolution, behavior, anatomy, physiology, ecology, and conservation; lab trips focus on identification of birds in the field. Prerequities: BIOL 206 and BIOL 208 or permission of the instructor. Crosslisted as BIOL 357.

370. Primate Behavior and Ecology (I; 3, 3*)
Introduction to research on prosimians, monkeys, and apes, including diversity, social evolution, sexual selection, reproduction, social behavior, and cognitive abilities. Prerequisites: BIOL 122, or BIOL 208, or BIOL 266 and permission of the instructor. Crosslisted as BIOL/PSYC 370.

391. Research (I, II, and S; R; 1-3, 1-3) Half to full course.
Independent research, with faculty supervision, in the study of animal behavior. Prerequisite: permission of the instructor.

399. Senior Thesis (I, II, and S; R; 2, 10)
Original research leading to a thesis presentation on a topic related to the study of animal behavior. Prerequisite: permission of the instructor. Seniors only.

415. Conservation Biology (II; 4, 0)
A synthesis of topics relating to the conservation of plants and animals including extinction, genetics, demography, insularization, threats to biodiversity, conservation economics,

environmental ethics, and strategies for conservationists. Prerequisites: BIOL 208 or BIOL 122 and permission of the instructor. Crosslisted as BIOL 415.

Anthropology

See Sociology and Anthropology

Art and Art History (ART)

Professor: Rosalyn A. Richards

Associate Professors: Christiane D. Andersson, Janice E. Mann, Xiaoze Xie (Chair)

Assistant Professors: Tulu Bayar, Michele Kong, Roger I. Rothman

Goals: An understanding of visual language gained by making or studying art is an essential component of a liberal arts education. The department of art and art history encourages interactions among the disciplines of art, art history, and museum studies. By fostering visual literacy, its curriculum enhances students' critical skills and prepares them for an increasingly visually oriented world. The faculty in art and art history, as well as the director of the Samek Art Gallery, translate this ideal into courses appropriate for students ranging from majors contemplating graduate studies in art, art history, or related fields, to nonmajors seeking a well-rounded academic background.

Majors: The department offers three majors, in art (the making of art), art history (analysis of art within its cultural context), and a major that combines art and art history. It also offers two minors in art and art history. The minimum number of courses to establish a major in art and in art history is nine, while the combined major requires 10. The maximum number of courses that may be elected in the department is 12. (For exceptions, see page 17. For transfer information, see page 302.) Students contemplating one of these majors are encouraged to discuss their interests and programs with the department chair or an appropriate department faculty member prior to declaring a major in the spring of the sophomore year.

Resources: We have well equipped studios in each of the four areas of painting, photography, printmaking, sculpture, and also a computer lab for digital photography. The slide library provides access to 75,000 color slides and is continually growing. The Samek Art Gallery, located in the Elaine Langone Center, organizes exhibitions and installation projects that put contemporary art and historical art in dialogue with other disciplines. Its permanent collection, including the Samuel H. Kress Collection of European paintings and especially strong holdings in the graphic arts and photography, is used for study and research by classes in art and art history. The department of art and art history and the Samek Art Gallery sponsor workshops, lectures, and on-site installations by visiting artists, critics, and historians. Students often work with visiting artists on their installations in the gallery, and serve as interns. Faculty and students take advantage of Bucknell's proximity to major museums and galleries through organized trips and individual travel to sites including New York City, Philadelphia, Baltimore, and Washington, D.C.

The Art Major

The art major consists of a minimum of nine courses, seven of which must be in art and two of which must be in art history.

Distribution of required courses:

- one course selected from ART 112 Basic Photography, ART 120 Introduction to Painting, ART 130 Introduction to Printmaking, ART 131 Elementary Drawing, ART 150 3-D Design
- one 200-level course in each of the four areas of photography, painting, printmaking, and sculpture
- two courses in art history, one of which must cover contemporary art
- two advanced course electives in art selected in consultation with the academic adviser and chosen from the four areas of photography, painting, printmaking, or sculpture.

No more than two of the nine required courses may be taken for credit elsewhere.

The Art Minor

The minimum requirement for a minor in art is five courses in studio art, including two of the following: ART 112, ART 120, ART 130, ART 131, ART 150. At least three courses must be above the 100 level. No more than one course may be taken elsewhere for credit.

The Art History Major

The minimum requirement for a major in art history is nine courses: eight in art history and one in studio art. Only two of the eight required art history courses may be taken at the 100 level. Of the remaining six courses, at least two must be taken at the 300 level or above.

Distribution of required courses:

- one studio art course to acquaint students with the creative process
- courses in three of the following four areas: Ancient and Medieval; Renaissance and Baroque; Modern and Contemporary; non-European art or art of minorities or women
- two 300-level (or above) art history courses emphasizing original research (these may count towards other distribution requirements)
- additional electives in art history, including museum studies courses, crosslisted courses, and internships

Sequencing of Courses: Although there are no prerequisites to any of the art history courses, students are encouraged to begin their study of art history with one or more introductory courses before engaging in course work on the 200 level or above. ART 101, 102, and 103, (World Art I, II, or III) familiarize students with the monuments and methods of the discipline.

In addition, it is advisable to take a broad survey of an art historical period before engaging in more specialized study of that period. For example, it is recommended that students take ART 101 World Art I: Caves to Cathedrals before taking ART 204 Castle, Cathedral, Cloister and ART 204 before ART 300 Special Topics in Medieval Art. Appropriate Capstone courses (such as recent departmental offerings on Renaissance Women or Expressions of Nationalism) also may be counted towards the major.

Interdisciplinary and Language Study: The department recommends that students select courses in other disciplines that will complement and strengthen their art history major. Permission from the chair also may be obtained to count one appropriate course taken in

another Bucknell department (for example, in ancient archaeology, cultural anthropology, or film studies) toward the major. Students considering this option should discuss it with their art history adviser and department chair.

A knowledge of languages is essential to the cross-cultural nature of art history and is a prerequisite for admission to graduate study in the discipline. All art history majors are urged to develop competence in at least one modern language. Majors contemplating graduate study should become competent in two of these languages (or in one modern language and one ancient language). Competence is normally defined as the completion of a 200-level language course. Students should consult with their art history adviser as early as possible concerning which language (or languages) is most appropriate to their interests in the field.

Study Abroad and Internships: Art history majors are encouraged to pursue opportunities for study abroad and for internships in galleries, museums, and other settings (see materials in art department office). No more than two course credits earned from non-Bucknell faculty, however, may be used to meet the minimum requirements for the major. Students planning to undertake off-campus or non-traditional study are expected to consult closely with their art history adviser and department chair.

The Art History Minor

The minimum requirement for a minor in art history is five courses in art history, including no more than one course at the 100 level and at least one course at the 300 level or above. In addition, students must take at least one course in three out of the following four areas of art history: Ancient and Medieval; Renaissance and Baroque; Modern and Contemporary; non-European art, art of minority groups or women. No more than two course credits earned from non-Bucknell faculty may be used to meet the minimum requirements for the minor.

The Combined Art and Art History Major

The minimum requirement for the combined major is 10 courses, including five courses in art, and five courses in art history. No more than two courses taken elsewhere will count toward the minimum requirements of the combined major.

Distribution of required courses:

- five courses in studio art including specialized courses in at least three distinct media and at least two courses at the 200 (or higher) level
- five courses including courses in at least three out of the following four areas of art history: Ancient and Medieval; Renaissance and Baroque; Modern and Contemporary; Non-European Art or art of minority groups or women with at least two of these courses at the 200 (or higher) level, one of which will be in modern/contemporary.

Honors in Art, Art History or Combined Art and Art History

A program leading to a major with honors in art, art history, or art and art history may be proposed by the student in consultation with the department chair and appropriate department faculty. The student generally undertakes a specifically designed sequence of courses and independent research culminating in a significant studio project or written thesis.

Graduate Study and Careers in Art and Art History
Students considering graduate studies in art, art history, art administration, art conservation, museum studies, or related fields, should consult CAA guides and other materials in the art department office. Department faculty members also will be glad to provide information on careers in art and art history and on M.A., M.F.A., and Ph.D. programs and fellowships.

Art

112. Basic Photography (I and II; 0, 4)
An introduction to the theory, practice, and criticism of fine art photography.

120. Introduction to Painting (I and II; 0, 4)
Studio course to introduce basic techniques and materials of painting, color theory and its application, image and composition.

130. Introduction to Printmaking (I or II; 0, 4)
An introduction to visual concepts and processes in intaglio, relief, and screen printing.

131. Elementary Drawing (I and II; 0, 8)
The tradition of drawing, its practice and theory in various media.

150. 3-D Design (I or II; 0, 4)
This course will introduce students to the principles of three-dimensional design. Problem solving will focus around the following concepts: line/plane, shape/form, color/texture, and scale. Prerequisite: seniors by permission.

229 and 230. Intermediate Printmaking (I and II; 0, 4)
Individual projects in intaglio and woodblock printing with an emphasis on concept and refinement of image. Prerequisite: permission of the instructor.

231. Intermediate Drawing (I and II; 0, 8)
A continuation of ART 131 with emphasis on concept and refinement of image. Prerequisite: permission of the instructor.

234. Digital Photography (II; 0, 4)
This course builds upon the principles of more traditional two-dimensional media, applying these in the use of digital tools. Emphasis will be placed upon exploration of digital tools toward creative ends. The impact of the use of these tools on more traditional art media also will be considered and discussed. Prerequisite: permission of the instructor.

237 and 238. Projects in Painting (I and II; R; 0, 4)
Individual projects in oil and acrylic-based media on supported canvas will be emphasized. Prerequisite: permission of the instructor.

243. Graphic Design I (I or II; 0, 3)
An introduction to the theory and practice of graphic design and the principles underlying the visual presentation of information, both verbal and pictorial. Prerequisites: ART 112, 130, 131, 150, or 234.

247. Intermediate Photography (I and II; 0, 4)
This course builds upon skills and knowledge gained in ART 112, including more complex technical and critical methods and development of a personal direction. Prerequisites: ART 112 and permission of the instructor.

250. Projects in Sculpture (I and II; 0, 8)
Studio work will introduce students to basic concepts in sculpture, focusing on ideas and materials. Mixed media applications will engage students in contemporary sculptural practices. Prerequisite: permission of the instructor.

255. Topics in Sculpture (I or II; 0, 3)
An investigation of specific topics in contemporary sculpture including process, public art, time and technology. These topics may vary yearly. Prerequisite: ART 150 or ART 250.

335 and 336. Advanced Work in the Studio (I and II; R; 0, 8)
Advanced projects in each studio area: painting, printmaking, photography, sculpture or graphics. This course may be repeated for additional credit. Prerequisite: permission of the instructor.

340. Multi-media and Installation Art (I or II; 3, 0)
This course builds upon the principles of interdisciplinary practices and histories of performance, installation, and video art. The class will function as a survey of modern and contemporary interdisciplinary art as well as a studio for individual and collaborative projects and actions in installation, performance and video. Prerequisite: one of the following: ART 112, ART 229, ART 237, ART 250.

345. Advanced Painting (I or II; R; 0, 3)
Independent painting projects to develop themes, concepts, and skills of painting in a contemporary context. Prerequisite: ART 237 or 238 and permission of the instructor.

346. Advanced Printmaking (I or II; R; 0, 3)
Advanced projects in printmaking to develop individual themes and concepts. Prerequisite: ART 229 or 230 and permission of the instructor.

347. Advanced Photography (I or II; R; 0, 3)
Advanced projects in photography to develop individual themes and concepts. Prerequisite: ART 247 and permission of the instructor.

348. Advanced Sculpture (I or II; R; 0, 3)
Advanced projects in sculpture to develop individual themes and concepts. Prerequisite: ART 250 and permission of the instructor.

435. Advanced Studio Capstone (I or II; TBA)
This course provides art students the opportunity to integrate their areas of study by designing a project which will encourage independent and collaborative creative activities.

History of Art

101. World Art I: Caves to Cathedrals (I; 3, 0)
This course explores the art and architecture created throughout the world from the prehistoric period to roughly the 14th century. Visual analysis will be the main focus.

102. World Art II: Renaissance to Enlightenment (I or II; 3, 0)
Examines the major achievements in history of Western painting and sculpture from the Renaissance through the Rococo and non-Western art of the same period (e.g., Maya and Inca cultures).

103. World Art III: Enlightenment to Now (I or II; 3, 0)
This course explores art from the 18th century to the present and includes works from both Western and non-Western cultures (e.g., Impressionist painting, Surrealist sculpture, Japanese prints, African masks).

204. Castle, Cathedral and Cloister (I; 3, 0)
Architecture, sculpture, and painting from the Early Christian period to the beginning of the Renaissance. Monastic, religious, and secular arts will be explored.

207. Modern Art: 1850 – 1915 (I; 3, 0)
Examination of artists and movements from 1850 to 1915, including Realism, Impressionism, Post-impressionism, Symbolism, Expressionism, Fauvism, Cubism, and Abstraction. Focus on innovations in French painting and urban experience.

208. Modern Art: 1915 – Now (II; 3, 0)
Examination of artists and movements after 1915, including Dadaism, Surrealism, Constructivism, Abstract Expressionism, Minimalism, Conceptual Art, and Performance Art. Issues of class, race, and gender will be central.

211. History of Photography (I or II; 3, 0)
History of photography from its origins in the 19th century to the present. Focus on the history of avant-garde practices as well as contemporary techniques and themes.

213. History of Western Architecture (I or II; 3, 0)
This course traces the "Western" architectural tradition with particular attention to technical advances and cultural context.

215. Architecture and Art in London (I; 3, 0) Half or full course.
To undertake the study of the art of England and other countries as presented by and in the city of London and its environs. Prerequisites: London Semester students only and permission of the instructor.

218. French Art and Architecture (II; 3, 0)
Selected topics in painting, sculpture, and architecture from the medieval period to the present time. Prerequisites: Bucknell *en France* students only and permission of the instructor.

221. Visual Cultures of the Mediterranean 1 - 1000 CE (AII; 3, 0)
This class explores the visual art and architecture of the cultures (Romans, Jews, Muslims, Christians, etc.) that lived around the Mediterranean in the first millennium.

222. Philosophy of Art (I or II; 3, 0)
Analysis of the creative process, the work of art, natural beauty, aesthetic experience, and principles of criticism. Prerequisite: PHIL 098 or PHIL 100, or PHIL 103, or PHIL 201, or PHIL 220. Crosslisted as PHIL 212.

225. Popular Culture and Prints (II; 3, 0)
Popular culture as expressed in prints: their subjects, history, purpose, and social significance from Albrecht Dürer to Andy Warhol. Study original prints in Bucknell's and NYC collections.

227. Introduction to Visual Culture (I or II; 3, 0)
Introduction to the interdisciplinary study of visual culture with particular attention to representations and media from popular culture (billboards, slasher films, music video, etc.). Emphasis on issues of class, race, and gender.

263. Curatorial and Gallery Practices (II; 3, 1)
Seminar focusing on exhibition planning and implementation, and gallery/museum theory and methodology. Prerequisites: ART 112, or ART 120, or ART 130, or ART 131, or ART 150, and ART 101, or ART 102, or ART 103, or permission of the instructor.

264. Museum Studies: Gillray Exhibition (I or II; 3, 0)
This seminar will study and mount an exhibition of the caricatures (original prints in Bucknell's Samek Art Gallery) of James Gillray (1756-1815), the English engraver who invented the genre of British political caricature. Students will learn all aspects of organizing an exhibition.

265. Topics in Aesthetics (II; R; 3, 0)
An investigation of specific topics in aesthetics, e.g., The Beautiful and the Sublime; Philosophy and Comedy; The Aesthetics of Film. These topics may very yearly. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220 or permission of the instructor.

271. Italian Renaissance Art (I; 3, 0)
Renaissance art in Italy with emphasis on Raphael, Leonardo, Michelangelo, Titian and others, and studying original paintings in Samek Art Gallery. Essential for students planning to study abroad in Italy.

272. Baroque Art – Power and Persuasion (II; 3, 0)
The visual culture of 17th-century Italy, Spain, The Netherlands, France, and Flanders focusing on dynastic, religious, theatrical and naturalist themes.

273. Northern Renaissance Art (II; 3, 0)
Renaissance art in Northern Europe and its interconnections with Italian art. Flemish, French, and German painting by van Eyck, Albrecht Dürer, Grünewald, Holbein, François Clouet, Primaticcio, compared with Raphael, Leonardo, painters in Venice.

275. Art and Architecture of the Islamic World (II; 3, 0)
A survey of Islamic art and architecture from the inception of the faith in the 7th century through the 16th century.

300. Special Topics in Medieval Art (I; R; 3, 0)
In-depth focus on one of several possible topics in medieval art, including the Cloister, the Portal, pilgrimage, or the saints. Prerequisite: ART 101 or ART 204 or permission of the instructor.

315. Seminar: Rembrandt's World (I or II; 3, 0)
Rembrandt's work studied in the context of his contemporaries (Vermeer, Hals, Rubens), and his experimental techniques, his imagery, his clientele, and his 17th-century world.

319 and 320. Special Studies in Art History (I and II; R)
Advanced problems in art history. Prerequisite: permission of the instructor.

323. Contemporary Art (I or II; 3, 0)
Study of key artists and concepts of the past 30 years. Focus on the transformation from modernism to postmodernism in painting, sculpture, photography, and performance art.

325. Special Studies in Modern Art (I and II; R: 3, 0)
Seminar focusing on selected aspects of the interaction between the fine arts, popular culture, and contemporary society in the modern world. Prerequisite: ART 102 or ART 103, or ART 211 or ART 227 or ART 323.

370. Kress Paintings Seminar (I; 0, 3)
Study and do research on the Samek Art Gallery's collection of original Italian Renaissance paintings (Kress Collection) and prepare new publication on these pictures.

371. Gillray Prints Seminar (II; 0, 3)
Study the political and social caricatures of English engraver James Gillray in original prints in the Samek Art Gallery collection; the tradition of caricature, and libel and freedom of speech issues.

419. Henry VIII and English Renaissance (I; 3, 0)
English Renaissance works of art illustrating political and dynastic concerns, especially royal portraits, studied in their historical and literary context.

Honors

350 and 351. Honors (I and II; R)
Independent study or creative work leading either to the writing of a thesis or the completion of a significant studio project. Prerequisite: permission of the instructor.

For courses in theatre production and design, see listings in Theatre and Dance.

Astronomy

See Physics and Astronomy

Biology (BIOL)

Professors: Warren G. Abrahamson, Mitchell I. Chernin, Kathleen C. Page

Associate Professors: Donald C. Dearborn, Marie C. Pizzorno (Chair), Mark D. Spiro (Associate Chair)

Assistant Professors: Morgan Benowitz-Fredericks (visiting), Elizabeth A. Capaldi, Kenneth A. Field, Julie A. Gates, Matthew B. Heintzelman, Stephen D. Jordan, Maureen Leonard (visiting), Matthew E. McTammany, Josef F. Novak (visiting), Leocadia V. Paliulis, DeeAnn Reeder, C. Tristan Stayton, Emily L. Stowe-Evans, Christy K. Wolovich

Biology is the natural science that concerns itself with study of the living world. The faculty of the biology department approaches the principles of the science from the unifying perspective of the theory of evolution. Emphases include both the theory and practice of the way scientific investigations are conducted as well as the more practical applications of biology.

A major in biology may serve as a sound preparation for those interested in careers in the life sciences including those who go on to graduate or medical school. Majoring in biology also adds to students' understanding of the issues concerned with health, the environment, and agriculture. In addition, Bucknell's biology majors are given the opportunity to become broadly educated "whole" scientists. They are encouraged to explore their interests within the humanities and social sciences.

Two degree programs are offered through the biology program.

The **bachelor of arts major** requires eight courses in biology: the core sequence of BIOL 205, BIOL 206, BIOL 207, BIOL 208, which must be completed by the end of the third year, and four 300-level or above electives. (Only one of the four electives can be BIOL 399, but additional BIOL 399 credit may be applied as electives beyond the courses offered for the major). At least one of the four electives must be in each of the following three areas (I – Cellular/Molecular; II – Organismal; III – Ecological/Evolutionary) listed below, and two of these courses from different areas must be a laboratory or field course.

Area I – Cellular/Molecular: BIOL 302 Microbiology, BIOL 322 Physiological Mechanisms, BIOL 323 Microanatomy, BIOL 324 Neurophysiology, BIOL 326 Cytogenetics, BIOL 327 Molecular Biology, BIOL 328 Endocrinology, BIOL 331 Functional Genomics, BIOL 340 Biochemical Methods, BIOL 343 Neural Plasticity, BIOL 347 Virology, BIOL 348 Immunology, BIOL 352 Cell Biology, BIOL 365 Introduction to Microscopy

Area II – Organismal: BIOL 303 Behavioral Neuroendocrinology, BIOL 312 Vertebrate Anatomy, BIOL 313 Mammalogy, BIOL 316 Plant Growth and Development, BIOL 318 Comparative Physiology, BIOL 339 Developmental Biology, BIOL 342 Neuroethology, BIOL 346 Environmental Physiology, BIOL 357 Ornithology, BIOL 358 Invertebrate Biology, BIOL 359 General Entomology

Area III – Ecological/Evolutionary: BIOL 315 Natural History of Vertebrates, BIOL 321 Behavioral Ecology, BIOL 330 Plant Systematics, BIOL 334 Limnology, BIOL 341 Organic Evolution, BIOL 353 Ecosystem Ecology, BIOL 354 Tropical Ecology, BIOL 355 Social Insects, BIOL 356 Plant-Animal Interactions, BIOL 361 Systematic Biology, BIOL 370 Primate Behavior and Ecology, BIOL 415 Conservation Biology

The biology major under the bachelor of arts degree also requires one year of organic chemistry, CHEM 211-212, which must be completed by the end of the sophomore year, and one year of mathematics, MATH 201 (calculus) and MATH 216 (applied statistics).

The **bachelor of science major** requires nine courses in biology. The major provisons in biology are the same as those noted above under the bachelor of arts major, but five rather than four 300-level electives are required, only one of which can be BIOL 399.

The bachelor of science major also requires: organic chemistry, CHEM 211-212, which must be completed during the first year, one year of mathematics, MATH 201 (calculus I) and MATH 216 (applied statistics), and one year of physics (PHYS 211-212). Two additional

courses in major-related areas are also required. Any two of the following courses will satisfy the requirements: CHEM 221, CHEM 231, CHEM 340, CHEM 351, CHEM 352; CSCI 203, CSCI 204; GEOL 103, GEOL 104, GEOL 106, GEOL 205, GEOL 213, GEOL 305, GEOL 310; MATH 202, MATH 211, MATH 217; PHIL 220, PHIL 272; PHYS 221; PSYC 250, PSYC 349; ANBE/BIOL/PSYC 266. Other courses may be substituted with department approval.

Students interested in behavioral aspects of biology may wish to consider the animal behavior major (pg. 27); those interested in biochemistry, the cell biology/biochemistry major (pg. 45); those interested in environmental issues, the environmental studies program (pg. 91), and those interested in neural biology, the neuroscience program (pg. 175). Students planning to continue with graduate training in biology are encouraged to elect MATH 217 Statistics II and/or MATH 202 Calculus II and to consult their academic adviser or pre-health professions adviser.

The recommended sequence for the bachelor of science major is as follows:

First Year	**First Semester**: BIOL 205; CHEM 211; MATH 201; Foundation Seminar **Second Semester:** BIOL 206; CHEM 212; MATH 216
Sophomore Year	**First Semester:** BIOL 207; Related area course **Second Semester:** BIOL 208; Related area course
Junior Year	**First Semester:** Elective in biology; PHYS 211 **Second Semester:** Elective in biology; PHYS 212
Senior Year	**First Semester:** Two electives in biology **Second Semester:** Elective in biology

Transfer students must complete at least four courses in biology in residence at Bucknell, only one of which may be BIOL 399.

For Bucknell students who elect to study abroad, at least three upper division courses toward the major and at least one toward the minor must be taught by Bucknell faculty.

Students who pass BIOL 121-122 and wish to major in biology may receive one core credit pending consultation with the department.

A **minor** in biology consists of five courses. Two of the five courses must be selected from among the following introductory level courses: BIOL 121, BIOL 122, BIOL 205, BIOL 206, BIOL 207, and BIOL 208. At least two of the courses must be 300-level courses, exclusive of BIOL 399.

Asterisks (*) indicate courses in which animal dissection **OR** experimentation with living animals may be involved in the laboratory.

111. Controversies in Biology (I; 3, 3)
Introduction for the non-science major. Background on molecules, cells, and genetics. Required discussions about current advances and controversies in biology. Not for pre-health students. Will not count toward the biology major. Students who take BIOL 111 may not take BIOL 121.

121 and 122. General Biology (I and II; 3, 3*)
Introductory courses primarily for the non-biology major. BIOL 121 focuses on life at the cellular and biochemical levels, genetics, and plant biology. The topics covered in BIOL 122 include principles of ecology and evolution, and animal diversity, behavior, structure, and function. Normally BIOL 121 is taken first.

150. Plants, People, and the Environment (AI; 3, 3)
The diversity and evolution of plants, fungi, and related organisms with special emphasis on flowering plants; their importance for food, fiber, medicine, and psychoactive compounds; origins of agriculture; domestication of plants; and the role of plants in the environment. No prerequisite required. Meets Lab Science requirement.

205. Introduction to Molecules and Cells (I; 3, 3)
An introductory course which focuses on the molecular biology of cells. Basic biochemical processes, cellular and subcellular structure and function are emphasized. First core course.

206. Organismal Biology (II; 3, 3*)
An introductory course for biology majors emphasizing organisms as dynamic systems by integrating structure with function. Laboratories introduce scientific method and collaborative learning. Second core course. BIOL 205 is strongly recommended as a prerequisite.

207. Genetics (I; 3, 3)
A comprehensive survey of genetic mechanisms and methodologies, including classical genetics, recombinational analysis in bacterial, fungi, and higher eukaryotes, molecular genetics and populational and quantitative genetics. Third core course. Prerequisite: BIOL 205.

208. Population and Community Biology (II; 3, 3)
Introduction to systematic biology, evolutionary theory, physiological ecology, behavioral ecology, population and community ecology, and ecosystem structure and function. Fourth core course. Prerequisite: a general biology course or BIOL 207.

220. Human Anatomy (I or II; 3, 3*)
A course that focuses on human muscles, bones, and organs. Not intended for biology majors.

221. Human Physiology (I or II; 3, 3)
A non-majors biology course that focuses on human organ systems.

245. Tropical Marine Biology (S; 5, 15)
A field course in marine biology of coral reefs in the Virgin Islands for non-science majors. Prerequisite: permission of the instructor.

266. Animal Behavior (I; 3, 0)
A survey of important theories, issues, and empirical techniques in the interdisciplinary field of animal behavior emphasizing both proximate and ultimate mechanisms and explanations for behavior. Crosslisted as ANBE 266 and PSYC 266.

302. Microbiology (II; 3, 3)
Ultra-structure, behavior, metabolism, molecular biology, and development of microorganisms. Roles in disease and food production. Laboratory will emphasize cultivation and identification. Prerequisites: BIOL 205, BIOL 207, and permission of the instructor.

303. Behavioral Neuroendocrinology (AI; 3, 0)
Relationship between the neuroendocrine system and animal behavior, including human behavior; incorporating and integrating evolutionary, developmental, and clinical perspectives. Prerequisites: BIOL 206 and permission of the instructor.

312. Comparative Vertebrate Anatomy (I; 3, 3*)
Organogenesis and gross morphology with emphasis on functional and evolutionary modifications of animal structure. Gross dissection and techniques used in morphology. Prerequisites: BIOL 122 or BIOL 206 and permission of the instructor.

313. Mammalogy (AI; 3, 3*)
Biology of mammals, including evolution, classification, biodiversity, behavior, anatomy, physiology, ecology, and conservation. Lab will include specimen identification, preparation, and field study. Prerequisites: BIOL 206 and permission of the instructor.

316. Plant Growth and Development (AI; 3, 3)
The physiological and molecular bases of growth and development at the organ, tissue, and cellular levels. Effects of environmental stimuli and hormones on gene expression and the resultant changes at higher levels of organization. Prerequisites: BIOL 205, BIOL 206, and permission of the instructor.

318. Comparative Physiology (I; 3, 0)
Compares the physiological mechanisms of animals, both invertebrate and vertebrate, from the standpoint of their evolutionary history and ecology. Prerequisites: BIOL 206 and permission of the instructor.

319 and 320. Seminar (I or II; R; 3, 0)

321. Behavioral Ecology (II; 3, 0)
The consideration of behavioral adaptations to various ecological situations. Topics include habitat choice, foraging behavior, defenses against predation, mate choice, and brood care. Prerequisites: BIOL 208 and permission of the instructor. Crosslisted as ANBE 321.

324. Neurophysiology (I; 3, 0)
A study of neural signaling via stimulus-response, with an emphasis on cellular integration. Sensory-motor as well as more complex brain systems will be explored. Prerequisites: BIOL 205 and 206 and permission of the instructor.

326. Cytogenetics (II, 3, 3)
Study of chromosome structure, organization, aberrations, and behavior. Multiple eukaryotic systems will be considered, with links to human disease. Prerequisites: BIOL 205 and BIOL 207 and permission of the instructor.

327. Molecular Biology (I and/or II; 3, 3)
Synthesis of DNA, RNA, and protein, and the regulation of these processes both prokaryotic and eukaryotic cells; laboratory experience in the manipulation and analysis of genes. Prerequisite: BIOL 205 and BIOL 207 and permission of the instructor.

328. Endocrinology (I; 3, 3*)
Regulation and function of hormones and their receptors from molecular to organismal levels. Role of hormones in development, physiology, and behavior; endocrine disease. Prerequisites: BIOL 205 and BIOL 206 and permission of the instructor.

334. Limnology (I; 3, 3)
The physical, chemical, and biological characteristics of freshwater communities are studied. Prerequisites: BIOL 208 and permission of the instructor.

339. Developmental Biology (II; 3, 3*)
Morphological, physiological, and biochemical aspects of cellular and embryonic development of animals and plants. Emphasis on the molecular genetics of development. Prerequisites: BIOL 205, BIOL 206 and permission of the instructor.

340. Biochemical Methods (II; 2, 6)
A course in laboratory techniques including cell fractionation and analysis of proteins and nucleic acids. Spectrophotometry, chromatography, centrifugation, electrophoresis, and methods of molecular cloning are emphasized. Prerequisites: BIOL 205 and permission of the instructor. Crosslisted as CHEM 358.

341. Organic Evolution (II; 4, 0)
The principles and mechanisms of evolution in plants and animals, covering population phenomena, speciation, life history strategies, adaptation, systematics, and biogeography. Prerequisites: BIOL 208 and permission of the instructor. Crosslisted as ANBE 341.

342. Neuroethology (I or II; 3, 0)
A course that integrates neurobiology and behavior in natural contexts. Emphasis on signal detection, recognition, discrimination, localization, orientation, and the control of complex acts. Neuronal and hormonal mechanisms, ontogeny and evolution of behavior will be considered. Prerequisites: BIOL 206, BIOL 208, and permission of the instructor. Crosslisted as ANBE 342.

343. Neural Plasticity (I; 3, 0)
Brain structure and function, emphasizing cellular and molecular approaches to neural development, plasticity and degeneration. Prerequisites: PSYC 250 or BIOL 205 and permission of the instructor. Crosslisted as PSYC 343.

347. Virology (I or II; 3, 0)
The study of virus structure, genome organization, replication and host-interactions. Emphasis will be on animal and bacterial viruses. Prerequisites: BIOL 205, BIOL 207, and permission of the instructor.

348. Immunology (II; 3, 3*)
Development and function of the immune system in animals. The immune response in health and disease. Techniques in immunology. Prerequisites: BIOL 205, 206, and permission of the instructor.

349. Special Topics in Biology (I or II; 3, 0)
Topics vary. Prerequisite: permission of the instructor.

352. Cell Biology (I and/or II; 3, 3)
Covers biomembranes, cell growth patterns, cell signaling, the cytoskeleton, cell organelles, and microscopic technique. Laboratory includes experience with cell culture. Prerequisites: BIOL 205 and permission of the instructor.

353. Ecosystem Ecology (AI; 3, 0)
Interactions between organisms and physical and chemical environment including nutrient cycling and energy flow, global biogeochemistry, temporal and spatial dynamics of ecosystems. Prerequisites: BIOL 208, junior or senior status, and permission of the instructor.

354. Tropical Ecology (I or II; 3, 0)
Introduction to tropical ecology, including life history strategies of vertebrates and invertebrates, biodiversity management and conservation. Emphasis on class and individual projects, data collection, and journal keeping. Prerequisites: BIOL 208 and permission of the instructor. Crosslisted as ANBE 354.

355. Social Insects (I; 3, 3)
Evolution and genetics of social behavior, caste, communication in foraging and colony defense, queen and worker control over reproduction, social homeostasis, and population dynamics. Occasionally may be taught as a laboratory science. Prerequisites: BIOL 208 and permission of the instructor. Crosslisted as ANBE 355. Juniors and seniors only.

356. Plant-Animal Interaction (I; 3, 3)
The coevolution and ecology of plants and animals covering pollination ecology, seed dispersal, plant-herbivore interactions, and habitat constraints on the behavioral ecology of animals. Prerequisites: BIOL 122 or BIOL 208 and permission of the instructor. Crosslisted as ANBE 356.

357. Ornithology (II; 3, 3)
The biology of birds, including evolution, behavior, anatomy, physiology, ecology, and conservation; lab trips focus on identification of birds in the field. Prerequisites: BIOL 206 and BIOL 208 and permission of the instructor. Crosslisted as ANBE 357.

358. Invertebrate Zoology (AI; 3, 3)
A survey of the invertebrate phyla covering phylogenetic relationships, functional morphology, ecology, life histories, symbiosis, ontogeny, and behavior. Includes hands-on study of organisms in lab and field. Prerequisites: BIOL 206, BIOL 208, and permission of the instructor.

359. General Entomology (AI; 3, 3)
The biology of insects and their kin: anatomy, physiology, ecology, behavior, development, evolution, systematics, and diversity. Prerequisites: BIOL 206, BIOL 208, and permission of the instructor.

365. Introduction to Microscopy (II; 3, 3)
This course is designed as an overview of light and electron microscopy, with emphasis placed on the use of instrumentation. Prerequisite: BIOL 352 and permission of the instructor.

370. Primate Behavior and Ecology (I; 3, 3*)
Introduction to research on prosimians, monkeys, and apes, including diversity, social evolution, sexual selection, reproduction, social behavior, and cognitive abilities. Prerequisites: BIOL 122 or 208, or 266 and permission of the instructor. Crosslisted as ANBE/PSYC 370.

399. Undergraduate Research (I or II or S; R; 0, 6* or 12*) Half to two courses.
Open to qualified juniors and seniors with the permission of the instructor.

415. Conservation Biology (I or II; 3, 0)
A synthesis of topics relating to the conservation of plants and animals including extinction, genetics, demography, insularization, threats to biodiversity, conservation economics, environmental ethics, and strategies for conservationists. Prerequisites: BIOL 208 or BIOL 122 and permission of the instructor. Crosslisted as ANBE 415.

Courses offered occasionally: 209 Human Genetics, 211 Concepts in Biotechnology, 268 Behavior and Ecology of Birds and Mammals, 315 Natural History of Vertebrates, 322 Physiological Mechanisms, 323 Microanatomy, 330 Plant Systematics, 331 Functional Genomics, 346 Environmental Physiology, 361 Systematic Biology

Black Studies Minor

Students may choose an interdepartmental black studies minor in one of three areas: African studies (see page 23), African American studies (see page 23), or Caribbean studies (see below).

Capstone Experience (CAPS)

Each student in the College of Arts and Sciences must satisfy the requirement of a Capstone course or an equivalent experience, usually in the senior year after all other general education requirements have been completed. The goal of the Capstone Experience is to provide opportunities for students to: (1) integrate knowledge within and across disciplines; (2) reflect and evaluate their entire educational experience; (3) make connections between the topic of focused study and real-world problems and questions that will continue to engage them after they leave Bucknell; and (4) interact with students who have different perspectives in order to foster a collaborative approach to learning and creative problem-solving that will carry over into their future lives.

Capstone courses may be interdisciplinary seminars open to all Arts and Sciences students or they may be offered by individual departments or groups of departments for their own majors. In all cases, they are small seminars of approximately 15 students in order to ensure maximum participation and interaction among class members.

Preregistration is required for spring Capstone courses.

Caribbean Studies Minor

Coordinators: Winston Griffith, Michael Moohr

The Caribbean studies minor is designed to provide students with a comprehensive understanding of the Caribbean region that moves beyond stereotypes and exoticism. In the various courses offered, students are able to explore the complexities of the region's economy and various economic organizations, its culture, society, geo-political significance and literature.

The minor serves as an important supplement for those students who are studying international relations, sociology, anthropology, economics, literature and politics, among other disciplines. Combining Caribbean studies with a major in one of the aforementioned areas contributes not only to the broadening of the horizon of the student but provides a strong

basis for pursuing graduate opportunities in such areas as development planning, development economics, international relations, sociology, anthropology, postcolonial literature, cultural studies, gender studies, and area studies. Other students may find that a background in Caribbean studies is useful in seeking employment in the foreign service, AID agencies, in many international organizations and in non-governmental organizations.

The interdepartmental minor in Caribbean studies consists of five courses selected from the following list. No more than two courses may be taken in any one department. Students must undertake a Capstone independent study course (IDPT 319/320 Interdepartmental Independent Study: Caribbean Studies).

ECON	222	Economic Topics: Economic History of the Caribbean
ECON	266	Political Economy of the Caribbean
ENGL	227	Caribbean Literature
FREN	236	Topics in Francophone Literature and Culture (when relevant)
FREN	395	Seminar in French Studies: Culture and Literature des Caribe
HIST	290	European Imperialism and Colonialism
IREL	230	International Relations of the Caribbean
SOCI	213	Race in Historical and Comparative Perspective
SOCI	290	The Sociology of Caribbean Society
SOCI	310	The Sociology of Developing Societies

Students, however, may count toward the minor only one of the following: HIST 290 European Imperialism and Colonialism, or SOCI 310 Sociology of Developing Societies.

Cell Biology/Biochemistry (BICH)

Coordinating Committee: Mitchell I. Chernin, Charles H. Clapp, Kenneth A. Field, Matthew B. Heintzelman, Kathleen C. Page (Director), Marie C. Pizzorno, David S. Rovnyak, James S. Swan

Other Participating Faculty: Dee Ann Casteel, Julie A. Gates, Leocadia V. Paliulis, Emily L. Stowe-Evans, Timothy G. Strein, Brian W. Williams

Developed jointly by the biology and chemistry departments, the major in cell biology and biochemistry at Bucknell is interdisciplinary in nature. The **bachelor of science major** is designed for students who are interested in understanding living organisms at the cellular and molecular level. This course of study will provide strong foundations in both biology and chemistry and will offer the student both the intellectual and the laboratory skills to grapple with questions at the interface of these two disciplines. In addition to a rigorous scientific education, this program enables students to gain a strong background in the liberal arts and to think critically about the impact of biotechnology on social and ethical issues.

The major in cell biology/biochemistry will focus on subdisciplines within biology and chemistry such as immunology, genetic engineering, nucleic acids, biomembrane function, cell biology of cancer, and enzymology. This program strongly emphasizes independent student research, including both seminar programs and hands-on research. A major in cell biology/biochemistry offers students an excellent preparation for careers in biotechnology, biomedical technology, medicine, pharmacology and bioengineering. It also is an excellent

foundation for students preparing for entrance into Ph.D. programs in cell and molecular biology or biochemistry or Ph.D./M.D. programs in medically related fields.

The major requires five courses within the biology department (BIOL 205, BIOL 206, BIOL 207, BIOL 327, and BIOL 352) and six courses within the chemistry department (CHEM 211, CHEM 212, CHEM 221, CHEM 231, CHEM 340 or CHEM 341, and CHEM 351).

Additionally, an interdepartmental Biochemical Methods course (BIOL 340/CHEM 358) is required as are three electives chosen from the following list: BIOL 302, BIOL 316, BIOL 318, BIOL 322, BIOL 323, BIOL 324, BIOL 326, BIOL 328, BIOL 329, BIOL 331, BIOL 339, BIOL 343, BIOL 347, BIOL 348, BIOL 365, BIOL 399; CHEM 313, CHEM 314, CHEM 317, CHEM 322, CHEM 332, CHEM 342, CHEM 352, CHEM 360, CHEM 375, CHEM 376, PSYC 250 and PSYC 343. At least one of these biology or chemistry electives must be a laboratory course. One full credit of a research course (BIOL 399, CHEM 375, CHEM 376, or CHEM 403) may be counted as an elective toward the major. Two semesters of physics (PHYS 211 and PHYS 212) and two semesters of calculus (MATH 201 and MATH 202) are required. A course selected from the following list of related humanities and social science courses also will be completed: HIST 170, HIST 171, HIST 270, HIST 271, HIST 272, HIST 273, HIST 279, HIST 370; PHIL 218, PHIL 220, PHIL 235, PHIL 272; RELI 240; SOCI 130; UNIV 245, or selected courses with permission of program director.

The recommended sequence for the bachelor of science major is as follows:

First Year	**First Semester:** BIOL 205; CHEM 211; MATH 201 **Second Semester:** BIOL 206; CHEM 212; MATH 202
Sophomore Year	**First Semester:** BIOL 207; CHEM 221 **Second Semester:** BIOL 327; CHEM 231
Junior Year	**First Semester:** BIOL 352; CHEM 351; PHYS 211 **Second Semester:** BIOL 340/CHEM 358; PHYS 212; Elective in biology or chemistry
Senior Year	**First Semester:** CHEM 341 or elective in biology or chemistry **Second Semester:** CHEM 340 or elective in biology or chemistry; Elective in biology or chemistry

Chemistry (CHEM)

Professors: Charles H. Clapp (Chair), Margaret E. Kastner, Timothy G. Strein

Associate Professors: Dee Ann Casteel, Thomas T. Shawe, Robert A. Stockland Jr., James S. Swan, Brian W. Williams

Assistant Professors: Karen J. Castle, Katherine N. Crowder (visiting), Justin C. Harris (visiting), William D. Kerber (visiting), Molly M. McGuire, Thomas P. Murosky (visiting), David S. Rovnyak, Eric S. Tillman, Lou Tom (visiting)

Chemistry is the science that seeks to understand the structure and composition of matter and the changes that it undergoes. The atomic/molecular perspective of chemistry provides fundamental insight into the macroscopic world of materials and organisms. Chemists apply this insight in many ways, such as the synthesis of new substances with useful technological or therapeutic properties and the discovery of new analytical methods that can be

used in medicine and environmental science. Coursework in chemistry seeks to acquaint students with fundamental chemical principles, teach students to apply these principles broadly and effectively, and enable students to evaluate critically the impact of chemistry on society.

In addition to providing a working knowledge of chemical principles, a major in chemistry offers experience in critical thinking, data analysis and experimental design. Chemistry graduates pursue a variety of careers in which these skills are important. Many work as chemists in chemical or pharmaceutical companies or in government labs. Others apply their chemical skills to careers in medicine, law, business, chemical or pharmaceutical sales, biotechnology, pharmacology, toxicology or environmental science. Many chemistry graduates pursue careers in education at the secondary, college or university level.

The department emphasizes the importance of research experience. The opportunity to engage in an original experimental investigation, in collaboration with a faculty member, is a distinctive feature of this program.

The chemistry major may be pursued under either the bachelor of arts or the bachelor of science degree programs. Students interested in biochemistry should consider either the bachelor of science chemistry curriculum with biochemistry and biology electives or the bachelor of science program in cell biology/biochemistry offered jointly by the chemistry and biology departments.

A **bachelor of arts major** consists of eight courses in chemistry numbered 211 or above, five of which are required: CHEM 211, CHEM 212, CHEM 221, CHEM 231, and CHEM 340 or CHEM 341. In addition, one semester of calculus (MATH 201) and one semester of physics (PHYS 211) are required. MATH 202 and PHYS 212 are strongly recommended.

A **bachelor of science major** consists of 10 courses in chemistry numbered 211 or above, eight of which are required: CHEM 211, CHEM 212, CHEM 221, CHEM 231, CHEM 322, CHEM 332, CHEM 341, and CHEM 342. The sequence of chemistry courses indicated below is strongly recommended; exceptions to this sequence are rare, and each must be negotiated with the student's adviser on the merits of the particular case.

The chemistry major under the bachelor of science program also requires three courses in mathematics (MATH 201, MATH 202, and MATH 211), three courses in physics (PHYS 211, PHYS 212, and PHYS 235), and one science elective.

The recommended sequence for the bachelor of science major is as follows:

First Year	**First Semester:** CHEM 211; MATH 201 **Second Semester:** CHEM 212; MATH 202
Sophomore Year	**First Semester:** CHEM 221; MATH 211; PHYS 211 **Second Semester:** CHEM 231; PHYS 212
Junior Year	**First Semester:** CHEM 341; science elective **Second Semester:** CHEM 322; CHEM 342; PHYS 235
Senior Year	**First Semester:** CHEM 332; Elective in chemistry **Second Semester:** Elective in chemistry

During the junior year, ELEC 105 in either semester may be substituted for PHYS 235. The science elective may be selected from the following list of courses and can be taken at any time once the prerequisites for the selected course are satisfied: BIOL 205; CHEG 450; CSCI 203; GEOL 305; MATH 212; PHYS 317, 329 and 330, 332, or 333 or other courses with department approval. Electives in chemistry during the senior year may be chosen from any of the 300-level undergraduate courses in chemistry or CHEM 403. No more than two credits of research, CHEM 375-376 or CHEM 403, may be applied toward the minimum 10-course major.

Advanced placement credit accepted by the University will count as a credit toward graduation, but will not replace the number of chemistry courses above 211 that are required for a major in chemistry. The requirement for CHEM 221 is waived for students with AP credit in chemistry but these students are required to take an advanced chemistry course to meet the number required for their degree.

Transfer students who are given at least 1.5 transfer credits toward graduation based on two semesters of general chemistry taken prior to transfer will be given an adjustment such that those two courses will replace the specific requirement for CHEM 221 and will count as one of the chemistry courses required for the chemistry degree.

Bachelor of science graduates will not automatically achieve the American Chemical Society's certification. To fulfill these requirements, bachelor of science chemistry students should take the equivalent of at least two additional laboratory or research courses, and biochemistry CHEM 351.

Of the 11 electives to be taken during the four undergraduate years, an additional mathematics course is desirable. Since science is an international enterprise, chemistry majors are encouraged to take a foreign language.

Students interested in coordinating graduate with undergraduate work should consult the department chair before the end of the sophomore year. The department offers a combined B.S./M.S. program for students who desire both more research and more advanced chemistry courses than are obtainable under the bachelor of science program. The B.S./M.S. program normally is elected in the sophomore year and is completed in the summer following the senior year.

Two **minors** are available in the department of chemistry:

The minor in chemistry requires six chemistry courses. One of the courses may be CHEM 160, CHEM 201 or CHEM 202; or AP chemistry credit. The other five must be numbered 211 or above and may include a maximum of one semester of CHEM 375, CHEM 376, or CHEM 403.

The chemistry (biochemistry) minor requires six chemistry courses numbered 211 or above, including CHEM 351 and CHEM 352 and may include a maximum of one semester of CHEM 375, CHEM 376, or CHEM 403.

105 and 106. Introduction to Chemistry (I and II; 3, 3)
A terminal elementary course covering in-depth selected topics, which may vary from year to year. Satisfies laboratory science requirement for bachelor of arts students not majoring in science or engineering. Either or both semesters may be taken. CHEM 105 is not a prerequisite for CHEM 106. Not open to students who have taken CHEM 160. Prerequisite: seniors by permission only.

160. Introduction to Environmental Chemistry (II; 3, 3)
One semester terminal course in chemistry. Basic chemical concepts as they relate to chemical behavior, toxicity, and effects in the environment. Case studies are used to illustrate concepts. Satisfies laboratory science requirement for bachelor of arts students not majoring in science or engineering. Laboratory will emphasize techniques used for environmental analysis. Not open to students who have taken CHEM 201, CHEM 202 or CHEM 211. Prerequisite: high school chemistry. Seniors by permission only.

201 and 202. General Chemistry (I and II; 3, 3)
Fundamental principles in inorganic chemistry. Atomic structure, bonding, equilibrium, kinetics, etc. Laboratory experiments are both qualitative and quantitative. CHEM 201 is a prerequisite for CHEM 202. Credit not normally given for both CHEM 201 and CHEM 221 nor is credit normally given for CHEM 202 and CHEM 221 or CHEM 231.

211. Organic Chemistry I (I; 4, 4)
First-year, first-semester course for students majoring in chemistry, biochemistry, and biology. Bonding and structure in organic compounds, resonance, organic acid/base reactions, basic nomenclature, conformational analysis, stereochemistry, properties and reactions of functional groups. Prerequisite: high school chemistry or equivalent.

212. Organic Chemistry II (II; 4, 4)
A continuation of CHEM 211 with focus on properties and reactions of functional groups, synthesis, and spectroscopic analysis. Prerequisite: CHEM 211.

221. Inorganic Chemistry I (I; 3, 3)
Atomic structure and introductory quantum mechanics. Molecular structure and theories of bonding. Introductory thermodynamics and kinetics. Introduction to coordination chemistry. Laboratory: introduction to quantitative techniques. Prerequisite: CHEM 212 or permission of the instructor.

231. Analytical Chemistry I (II; 3, 3)
Chemical equilibrium and modern analysis with an emphasis on acid-base systems, solubility, metal ion determinations, electroanalytical, spectrophotometry, and separation methods. Prerequisite: CHEM 221.

304. X-ray Crystallography (I or II) Half to full course.
Independent study. Symmetry (point, plane, and space groups), diffraction (reciprocal space, precession photographs, automated data collection) and structural solution (Patterson Maps, Electron Density Maps, Refinement). Prerequisite: permission of the instructor.

313. Synthetic Organic Chemistry (I or II; 3, 0)
Modern synthetic organic chemistry, with examples involving complex natural products. Application of organic mechanism, synthetic strategy, and advanced transformations to total synthesis. Prerequisite: CHEM 212.

314. Mechanistic Organic Chemistry (I or II; 3, 0)
Thermal and kinetic aspects of organic reactions are discussed along with the effect of substituents, solvents, and stereochemistry on reaction pathways. Qualitative molecular orbit theory of organic compounds is covered in depth. Weekly problem sessions are held. Prerequisites: CHEM 211 and CHEM 212.

317. Special Topics in Organic Chemistry (I or II; R; 4, 0)
Available by independent study. Prerequisites: CHEM 212 and permission of the instructor.

322. Inorganic Chemistry II (II; 3, 4)
Survey course in modern inorganic chemistry covering transition metal, coordination, organometallic, and bioinorganic chemistry. Laboratory will consist of synthetic and physical measurements as well as the manipulation of air-sensitive materials. Prerequisite: CHEM 231.

327. Special Topics in Inorganic Chemistry (I or II; 4, 0)
Available by independent study. Prerequisites: CHEM 322 and permission of the instructor.

332. Analytical Chemistry II (I; 3, 4)
Theory and practice of techniques of instrumental analysis including spectrophotometry, fluorescence, mass spectrometry, atomic absorption, chromatography, capillary electrophoresis, polarography, and specific ion electrodes. Prerequisite: CHEM 231.

337. Special Topics in Analytical Chemistry (I or II; 4, 0)
Available by independent study. Prerequisites: CHEM 231 and permission of the instructor.

340. Biological Physical Chemistry (II; 4, 3)
Introduction to physical chemistry for life science students, with emphasis on thermodynamics, colligative properties and spectroscopy. Not open to BS chemistry majors. Prerequisites: CHEM 231, MATH 201, and PHYS 211. MATH 202 and PHYS 212 are recommended.

341. Physical Chemistry I (I; 3, 4)
Introductory physical chemistry with emphasis on thermodynamics, kinetics, and electrochemistry. Prerequisites: CHEM 231, MATH 211, and PHYS 212. Not open to engineering majors.

342. Physical Chemistry II (II; 3, 4)
Introductory physical chemistry with emphasis on quantum mechanics, molecular spectroscopy and statistical mechanics. Prerequisite: CHEM 341.

343. Physical Chemistry for Engineers (I; 3, 1)
Introductory physical chemistry for engineers with emphasis on thermodynamics, kinetics, and electrochemistry. Prerequisites: CHEM 231, MATH 211, PHYS 212. Only open to engineering majors.

347. Special Topics in Physical Chemistry (I or II; 4, 0)
Available by independent study. Prerequisites: CHEM 342 and permission of the instructor.

351. Biochemistry I (I; 4, 0)
Introduction to biological chemistry with emphasis on the structure and function of proteins, lipids, carbohydrates and nucleic acids, kinetics and mechanisms of enzymes, bioenergetics, and metabolism. Prerequisite: CHEM 231 or permission of the instructor.

352. Biochemistry II (II; 4, 0)
Advanced topics in protein structure and function, protein folding, enzyme mechanisms, electron transport and free-energy coupling mechanisms, biosynthesis, metabolic regulation, and supramolecular assemblies. Prerequisite: CHEM 351 or permission of the instructor.

357. Special Topics in Biochemistry (I or II; 3, 1)
Structure/function relationships and dynamics of biomolecules. Prerequisite: permission of the instructor.

358. Biochemical Methods (II; 2, 6)
A course in laboratory techniques including cell fractionation, protein, and nucleic acid analysis. Spectrophotometry, chromatography, centrifugation, electrophoresis, and mass spectrometry are emphasized. Prerequisite: permission of the instructor. Crosslisted as BIOL 340.

360. Advanced Environmental Chemistry (I; 4, 0)
Environmental chemodynamics, transport, abiotic transformation, biotransformation, environmental toxicology, pollutants, the environmental fate/effects of chemicals will be discussed. Prerequisite: CHEM 231 or permission of the instructor.

375 and 376. Undergraduate Research (I and II; R; 0, 6-24) Half to two courses.
Original investigations in analytical, biological, organic, physical, environmental, or inorganic chemistry.

385 and 386. Seminar (I and II; R; 2, 0) Half course.

403. Research in Chemistry Capstone (II; 2, 10)
Students conduct a research project under the guidance of a faculty member in the sciences. In weekly meetings, they share reports from the literature, report on their own work, and consider other issues and topics important in the conduct of research. Prerequisite: permission of the instructor.

Children's Studies Minor

Coordinators: Chris Boyatzis, Lori Smolleck

The interdepartmental Children's Studies minor offers a multidisciplinary perspective on children and childhood to help students achieve a deeper and broader understanding of children and childhood. Children are examined in contexts of culture, historical era, educational systems, socioeconomic class, geographic setting, religious ideology, political and economic systems, and so on. In addition, Children's Studies is concerned with children's "lived" experience. Thus, some courses may examine exigencies that affect hundreds of millions of children globally (e.g., poverty, hunger, war, disease, labor, etc.).

Children's Studies also emphasizes advocacy and service for children. Thus, many courses in the minor involve a service-learning or fieldwork component in which students work with children directly (e.g., in a hospital, community center, counseling clinic, school). These opportunities not only enrich students' understanding of children but enhance students' growth as involved citizens and also benefit children and organizations in the community.

The Children's Studies minor could benefit students from many departments. Many education and psychology students could be interested but there are other audiences and specialized interests: pre-med students interested in pediatrics, English majors interested in children's literature, pre-law students interested in family law or child advocacy, computer science or engineering students interested in educational or recreational software, and so on. Collectively, the courses in the minor will expose students to new undergraduate opportunities as well as varied educational and career options.

The **minor** consists of five courses from below, with the following stipulations. At least four courses must be at the 200 level or above, and no more than two courses taken in any one department can count toward the minor. Per University policy (see catalog, p. 295) students cannot double count courses for a major and a minor. (Thus, for example, an ELED major could not count EDUC 201 for this minor because it is required for the ELED major, but the student could use PSYC 307 to count for the minor.)

CAPS	413	European History: Fairy Tales
CAPS	498	Children's Studies
EDUC	201	Educational Psychology
EDUC	318	Multiculturalism and Education
EDUC	323	Education of Young Children
EDUC	334	Late Childhood and Adolescence
EDUC	335	Child and Adolescent Development
ENGL	218	Studies in Children's Literature
ENGL	220	Young Adult Fiction
ENGL	290	Special Topics: Introduction to Children's Literature
FOUN	0XX	Children's Media and Advertising
FOUN	0XX	The Brothers Grimm and Beyond
MUCS	136	Music for Classroom Teachers
PSYC	207	Developmental Psychology
PSYC	307	Culture and Child Development
SPAN	323	Latin American Short Stories for Children

Chinese

See East Asian Studies

Classics (CLAS)

Associate Professor: Janet D. Jones (Chair)

Assistant Professors: Kevin F. Daly, Stephanie Larson

The curriculum of the department of classics offers students opportunities to study the Mediterranean world of the ancient Greeks and Romans and, to a more limited extent, the

societies of the Near East and Egypt. Some courses also stress the classical tradition, the western inheritance of Greco-Roman ideas and art forms. The department offers varied kinds of courses through which students may approach the study of the ancient world, including courses in Greek and Latin.The classics curriculum offers a broad interdisciplinary approach to classical studies which prepares students well for a wide range of careers. A broad liberal arts education and training in critical, rigorous thinking and writing provide our students with the tools necessary to succeed in such varied careers as law, teaching, journalism, and business, and to adapt well to the rapid pace of change characteristic of contemporary life.

To facilitate students' exploration of the diversity and complexity of the ancient world and the contemporary disciplines that study it, the department of classics groups its courses into five categories: 1) Ancient History and Society, 2) Archaeology and Material Culture, 3) Myth and Text, 4) Greek, 5) Latin.

The Major and Minors in Classics

The department recommends that a student choosing a major or minor in classics develop a focus in at least one of the above categories. Students who may have an interest in pursing graduate studies in classics are strongly recommended to include concentrated language study of Greek and Latin in their curriculum.

A **major** in classics consists of a minimum of eight courses, with the following requirements:

- at least two courses in Greek or Latin.
- at least two courses in Classical Humanities offered by the department of classics. Additional courses that relate to Classical Humanities offered by other departments (e.g., ART 101) may be applied to the major in classics with the adviser's approval. No more than two courses of the Classical Humanities at the 100 level can count toward the major.
- an integrative course approved by the adviser. The nature of this course will vary from student to student, and may be a 300-level seminar in classics; the honors sequence CLAS 321-322; an independent study (CLAS 311); or a Capstone Seminar offered by classics, another department, or the College of Arts and Sciences.

Students are encouraged to choose an honors program in classics, Greek, or Latin. Candidates for honors must take CLAS 321-322 and pass with distinction the oral examination on the thesis.

The department encourages its majors to study abroad in a Mediterranean setting, in Italy or Greece especially. Several options, for a semester, a year, or a summer, are available.

Three **minors** are offered by the department of classics.

- The Greek minor consists of four full-credit courses in Greek at any level taken at Bucknell.
- The Latin minor consists of four full-credit courses in Latin at any level taken at Bucknell.
- The minor in classics consists of five courses in classics, including no more than two courses in Greek and/or Latin. The minor in classics may include up to two courses offered by other departments or programs, chosen from a list that is periodically updated. This list includes HUMN 98, ART 101, PHIL 205, and POLS 250.

Classical Humanities (CLAS)

The courses in Classical Humanities are grouped into three categories: Ancient History and Society, Archaeology and Material Culture, and Myth and Text. Ideally, these courses are, except where noted, offered on a two-year cycle. A select number of courses may be offered annually. A calendar of the cycle along with more detailed course descriptions are available from the departmental secretary, Stephanie Snyder. Classical Humanities courses do not require knowledge of Greek or Latin. Although the courses are grouped according to their major focus, most courses may involve elements from all three tracks (material culture, history and society, myth and text).

Ancient History and Society

Courses in this category focus upon the study of the culture and society of ancient Greece, Rome, and the Near East, including religion, politics, law, sexuality, economics, education, and patterns of thought and behavior, as well as the approaches and methodologies of ancient historians.

131. Greek Civilization (I or II; 3, 0)
Introduction to the study of ancient Greek civilization through its art, literature, history, religion, etc. Emphasis on the classical period. Seniors by permission of the instructor.

132. Roman Civilization (I or II; 3, 0)
Introduction to Roman civilization from Romulus to Constantine. Emphasis on social and cultural history, including literature, art, architecture, religion, and historiography in their cultural context. Seniors by permission of the instructor.

217. Greek History (II; 3, 0)
Greek history from the heroic Bronze age down through the Persian invasion, the flourishing of Classical Athens, and the Peloponnesian wars to the death of Socrates, focusing on political, social and economic developments. Crosslisted as HIST 240.

218. Roman History (II; 3, 0)
Roman history from Rome's foundations as a backwater village ca. 753 BCE through its rise as a world-power to its fall in the fourth century CE, focusing on economic and political issues. Crosslisted as HIST 241.

231. Religions of the Ancient Mediterranean (I; 3, 0)
Study of the various religions of the ancient Mediterranean, especially Greek and Roman pagan practices as well as Near Eastern influences and early Christianity.

233. The Age of Alexander the Great (AI: 3, 0)
Study of the transformation of Classical Greek culture into a civilization dominating the Mediterranean world and its Eastern neighbors. Topics may include art, urban culture, politics, intellectual expressions, and religious innovation.

236. The Age of Augustus (AI; 3, 0)
Study of late republican-early empire Rome, emphasizing the transition from the republic to empire, the role played by Augustus in this transition, the tension between East and West, and the crisis of morals.

237. Ethnicity, Gender and Identity in Antiquity (AI or AII; 3, 0)
Ancient Greek and Roman perceptions, both social and biological, of gender (including sexuality) and ethnicity. Includes discussion of the social position of women and other marginal members of society in antiquity.

332. Classical Athens (I; 3, 0)
An in-depth, integrative study of Athens from the 6th-4th centuries including its literature, arts, architecture, religion, philosophy, politics. Some background required. Prerequisite: permission of the instructor.

Material Culture/Archaeology

Courses in this category focus upon the study of the physical evidence, including the processes by which material objects from the ancient world are uncovered and analyzed; the evolution of urban forms; the expressions of architecture and art; the theories and practices of ancient technology; and the relationships which ancient cultures had with their environments and ecosystems.

141. Ancient Cities (AI; 3, 0)
Introduction to Near Eastern and Greco-Roman civilization through study of major urban centers. Seniors by permission of the instructor.

241. Archaeology of Egypt (AII; 3, 0)
Survey of the material culture, with emphasis on major architectural and artistic developments and their legacy to modern Western civilization.

242. Archaeology of Greece (AI; 3, 0)
Survey of the material culture of the Greek world from the Bronze Age through the Hellenistic period.

243. Archaeology of Rome (AII; 3, 0)
Survey of the material culture of the Roman world from the Etruscans through the late Empire.

247. Ancient Technology (AI; 3, 0)
A detailed survey of the state of ancient technology by the time of the early Roman empire in its economic and social context. Topics include sources of power, mining and metallurgy, quarrying, land and sea transport, and the urban infrastructure.

Myth and Text

Courses in this category focus upon the study of the traditions of ancient mythology, the major Greek and Roman literary works and authors in translation, and the ways in which images and ideas from ancient myths and texts found shape in later literary traditions. Students interested in these topics also may want to consider the literature courses in Greek and Latin (see below).

98. Myth, Reason, Faith (I or II; 4, 0)
This course, which is also a Foundation Seminar, is designed to introduce students to some of the most significant works in the Western intellectual tradition. Works by major writers from Homer to Dante will be studied. Crosslisted as ENGL 98, HUMN 98, and PHIL 98.

215. Classical Myth (AI; 3, 0)
Study of the traditional tales of Greece and, to a lesser extent, the Near East and Rome; consideration and application of myth theory.

220. Classical Literature (I or II; R; 3, 0)
Interpretive study of a literary genre (e.g., history, lyric, satire, novel) or topic in works of the Greco-Roman period and beyond. May be repeated for credit when the topic varies.

221. Heroic Epic (AI or AII; 3, 0)
Interpretive study of Homer's *Iliad* and *Odyssey* and other epics chosen by the instructor (e.g., the *Argonautica* and *Aeneid*). Study may include epic works of later traditions.

222. Greek Tragedy (I or II: 3, 0)
Interpretive study of the works of Aeschylus, Sophocles, and Euripides.

223. Ancient Laughter (I or II; 3, 0)
Interpretive study of Greco-Roman dramatic comedy (works of Aristophanes, Plautus, and Terence) and the comic traditions.

224. Poetry of Passion in Greece and Rome (AI or AII; 3, 0)
Interpretative study of Greek and Latin poetic genres (such as lyric, epigram, elegy, pastoral, and satire), with an emphasis on the representation of love and sexuality. May include discussion of post-classical traditions of erotic poetry.

Further Courses, Seminars, and Independent Study

Foundation Seminar (I or II; 3, 0)
Topics vary. First-year students only.

250. Topics in Classics (I or II; R; 3, 0)
Study of a topic relating to the classical world and its tradition. Examples: slavery, women, religions, a historical period. May be repeated for credit when the topic varies.

311. Independent Study in Classics (I or II; R) Half to full course.
Topics in classical civilization, to be chosen by the student. Prerequisite: permission of the instructor.

321 and 322. Honors Tutorial and Thesis (I and II)
Independent study and research leading to the writing of a thesis.

350. Seminar on a Classical Topic (I or II; R; 3, 0)
Study of a topic of importance in classics. Examples: a current problem, an important figure, a historical period.

450. Capstone Seminar on a Classical Topic (I and II; 3, 0)
Study of a topic of importance in classics. Open to seniors.

Courses offered occasionally: 226 Ancient Conflict and Competition, 239 Fall of Rome and Rise of Byzantium

Classical Languages: Greek (GREK) and Latin (LATN)

The courses in Classical Languages are grouped into Greek and Latin and involve the study of the language and reading of primary authors. Although Latin and ancient Greek are no longer spoken, we encourage students to study language knowing that work with the ancient languages encourages logical thought, provides a sophisticated grasp of the possibilities of language, enhances an understanding of the culture, and gives the student opportunities to study at first hand some of the greatest works of the human spirit.

Beginning and Intermediate sequences (101, 102, 151) are offered in both languages each year. Courses beyond the intermediate level are offered according to demand.

Greek (GREK)

Students with previous Greek experience should consult a member of the department when choosing where to start in the sequence. The sequence begins with 101 in the fall semester.

101 and 102. Introductory Classical and Biblical Greek (I and II; 4, 0)
An introduction to the classical and koine forms of the language. Emphasis upon forms and grammar, and rapid development of facility in reading. In the second semester, selections chosen from a range of Greek periods. Prerequisite for GREK 102: GREK 101 or equivalent.

151. Intermediate Greek (I and/or II; 3, 0)
Study of selected works in Greek, including such authors as Euripides, Herodotus, Lysias, Plato, Xenophon. Review of forms and grammar. Prerequisite: GREK 102 or equivalent.

221. Studies in Greek Literature (I and II; R; 3, 0)
Study of a topic or author focusing on original Greek texts (e.g., Herodotus, Homer, Sophocles, Plato, New Testament). Highly recommended for students anticipating application to graduate programs in classics or divinity. Prerequisite: GREK 151 or equivalent.

311. Independent Study in Greek (I or II; R)
Independent study of Greek texts with concomitant study of secondary sources. Prerequisite: permission of the instructor.

Latin (LATN)

The introductory and intermediate sequence of LATN 101, LATN 102, LATN 151 is offered each semester. LATN 151 is intended for students with at least two semesters of college Latin or three or more years of secondary school Latin. Students with two or fewer years of secondary school Latin should enroll in LATN 101 or LATN 102; consultation with a member of the department is advised.

101. Introductory Latin (I and II; 4, 0)
Introduction to the language. Emphasis upon forms and grammar, and rapid development of facility in reading. Not open to students having completed LATN 106.

102. Introductory Latin (I and II; 4, 0)
Continuing study of Latin grammar with review of basic material, including the introduction to Latin reading. Prerequisite: LATN 101 or equivalent. Not open to students having completed LATN 106.

151. Intermediate Latin (I and II; 3, 0)
Review of the grammar necessary for the introductory reading of selected Roman authors. Authors may include Plautus, Cicero, Catullus, and Vergil. Prerequisite: LATN 102 or LATN 106 or equivalent.

221. Studies in Latin Literature (I and II; R; 3, 0)
Advanced reading in Latin authors. Authors vary by semester, prose and poetry offered in alternate semesters. May be repeated as topics vary. Prerequisite: LATN 151 or equivalent.

311. Independent Study in Latin (I or II; R)
Independent study of Roman authors, with concomitant study of secondary sources. Prerequisite: permission of the instructor.

Comparative Humanities

See Humanities

Computer Science (CSCI)

Computer science programs stress the foundations of the experimental discipline. In each course, students solve programming problems whose solutions draw on capabilities learned in earlier courses. This problem solving guides the student toward a more complete understanding of the programming process. The programs give all the students particular expertise in the systems area of computer science.

Students are prepared for lifelong learning in this rapidly evolving discipline. Typically, graduates take entry-level positions in hardware and software systems application and design or continue their education at the graduate level.

A computer science major may be pursued under any one of four degree programs: bachelor of arts, bachelor of science, bachelor of science in computer engineering (see page 253) and bachelor of science in computer science and engineering (see page 255). The bachelor of science in computer science curriculum is accredited by the Computer Science Accreditation Commission of the Computing Sciences Accreditation Board. Students interested in the computer science major should consult the department concerning the choice of degree program.

The **bachelor of arts major** curriculum provides the student with an opportunity to combine the liberal arts tradition with strong preparation in computer science. It requires eight course credits in computer science: CSCI 203, CSCI 204, CSCI 206, CSCI 208, CSCI 311, CSCI 315, and either CSCI 479 and one 300-level elective or two 300-level electives. In addition, the following mathematics courses are required: MATH 201, MATH 202, MATH 211, MATH 226, and MATH 241. (MATH 226 is a half course.)

The **bachelor of science major** curriculum requires 11.5 course credits in computer science: CSCI 203, CSCI 204, CSCI 206, CSCI 208, CSCI 240, CSCI 311, CSCI 315, CSCI 341, and CSCI 479, and three computer science electives that may be at the 300 level or above. In addition, the following courses are required: MATH 201, MATH 202, MATH 211, MATH 226, and MATH 241; ENGR 139; PHYS 211, PHYS 212, and PHYS 235; one additional science course.

The recommended sequence for the bachelor of science major is as follows:

First Year	**First Semester:** CSCI 203; MATH 201 **Second Semester:** CSCI 204; MATH 202
Sophomore Year	**First Semester:** CSCI 206; MATH 211; PHYS 211 **Second Semester:** CSCI 208; MATH 241; PHYS 212
Junior Year	**First Semester:** CSCI 311; ENGR 139; MATH 226* **Second Semester:** CSCI 240*; CSCI 315; PHYS 235 ; One elective in computer science
Senior Year	**First Semester:** CSCI 341; CSCI 479 **Second Semester:** Two electives in computer science

*Half course, all others are one-credit courses

The **minor** in computer science requires CSCI 203, 204, 206, and two additional courses chosen from CSCI 208 and the 300-level computer science courses.

The computer science course descriptions begin on page 273.

Dance

See Theatre and Dance

East Asian Studies (EAST)

Professor: Paul H. Noguchi

Associate Professors: Erik R. Lofgren (Chair), James J. Orr, James R. Pusey

Assistant Professors: Elizabeth L. Armstrong (adjunct), Xing Fan (visiting), Anne Wang Pusey (adjunct)

The civilizations of East Asia offer a wealth of human experience of invaluable import to every academic discipline. Unbroken cultural lines of great antiquity lead to modern East Asian cultures of ever growing global significance. Whether we look first to the past, the present, or the future, in studying East Asia we study ourselves and our world.

A traditional liberal education, limited to the study of "Western" civilization, is no longer a liberal education. The department of East Asian studies, therefore, offers courses for all Bucknell students, as well as for the special interests of students choosing either the East Asian studies major or one of the department's three minors: in East Asian studies, Chinese, or Japanese.

The **major**, requiring an emphasis on either China or Japan, entails a program of study (created in consultation with a department adviser) that requires a minimum of 10 courses: six language courses in the language of one's emphasis (Chinese or Japanese) and four cultural courses, of which one must be outside one's emphasis (on China or Japan), and one – to provide a broad historical introduction to East Asian civilizations – must be chosen from the following:

For the China emphasis: EAST 111, EAST 233, EAST 234, EAST 267
For the Japan emphasis: EAST 111, EAST 254, EAST 255, EAST 256

The department offers three **minors**. A minor in East Asian studies consists of a coherent group of five courses offered or crosslisted by the department, one of which must be chosen from EAST 111, EAST 233, EAST 234, EAST 254, EAST 255. A minor in Chinese or Japanese consists of six department courses, of which four must be in the respective language.

All students majoring or minoring in the East Asian studies department are strongly encouraged to seek opportunities for summer, semester, or preferably, full-year study in China or Japan. Bucknell is a member of the Associated Kyoto Program, under which students may, if accepted, spend their junior year at Doshisha University. Many other opportunities to study in East Asia also are available.

111. East Asian Civilization (I; 3, 1)
The development of Chinese, Korean, and Japanese civilizations highlighting their political, cultural, philosophical, and religious aspects from earliest times to the present.

115. Introduction to Asian Religions (I or II; 3, 1)
A comparative study of the basic teachings and practices of Asian religions through lectures, discussions, readings, and films; inquiry into similarities and differences and views of nature. Prerequisite: first-year or sophomore standing. Others by permission of the instructor. Crosslisted as RELI 115.

120. Introduction to Chinese Culture (I; 3, 0)
Chinese culture from antiquity to the middle of the 20th century; transformation of major traditions in philosophy, religion, calligraphy, poetry, painting, music, fiction, and traditional theater.

130. Business Japanese: Language and Culture (II; 3, 0)
Basic Japanese business conversation, basic writing skills, and accepted conventions in the Japanese business world. No prerequisite.

211. Premodern Japanese Literature in Translation (AI or AII; 3, 0)
The beginnings of Japanese literary traditions: works written before the close of the 19th century – before Western influence is seen. Taught in English.

212. Modern Japanese Literature in Translation (I; 3, 0)
Literary trends in 20th-century Japan with emphasis on the development of the modern novel and short story. Works by Soseki, Tanizaki, Kawabata, Mishima, Abe, Enchi, Murakami, and others. Taught in English.

213. Traditional Chinese Literature in Translation (I or II; 3, 0)
Great works of Chinese prose and poetry from *The Book of Odes* to *The Dream of the Red Chamber*.

215. Haiku Poetry: From Basho to the Beats (II; 3, 0)
Study of the history and techniques of haiku poetry focusing on interpreting poems via close reading and applying poetic principles to composing verse.

220. Japanese Warrior in Literature (I; 3, 0)
Traces the literary (re)construction of the 'warrior' in Japanese literature, from the samurai of the 12th century to the Imperial soldier of the mid-20th century. Taught in English.

222. Passion/Perversion: Japan Film (II; 3, 3)
A discussion class in which numerous modern Japanese films are used to explore the representation of desire, both passionate and perverse. WARNING: explicit sexual content.

223. Japanese Ghosts and Monsters (II; 3, 0)
Survey of the supernatural in materials ranging from myths to films with emphasis on the relationships of transformations in society and culture to evolving depictions of the paranormal.

224. Asian Art (I or II; 3, 0)
China and Japan – highlighting issues of the artist, political and cultural identities, tradition/change – explored through diverse resources (Bucknell's Samek Art Gallery included) and methodologies.

233. China from Ancient Times to the 18th Century (I; 3, 0)
Chinese history and culture from their beginnings to the middle of the Qing Dynasty, before that dynasty and China were challenged by the West. Crosslisted as HIST 293.

234. China Since 1800 (II; 3, 0)
China from the eve of its modern confrontation with the West to the present through years of traumatic challenge and change. Crosslisted as HIST 294.

235. Drama and Theatre in China (II; 3, 0)
Survey course on the history of Chinese drama and theatre as social and cultural institutions.

239. Tradition and Transformation (S; 3, 0)
A summer trip to China to study past and present in five historical capitals. Prerequisite: permission of the instructor.

244. Religions of East Asia (I; 3, 0)
Focused study on one or more East Asian religious traditions. This course centers on religions and on topics that may include, but will not be limited to: Confucianism, Daoism, Buddhism, Shinto, and new East Asian religious movements. Crosslisted as RELI 244.

245. Consumption and Material Culture (I; 3, 0)
Anthropological studies of consumption of material goods in their cultural contexts, American and Japanese studies from fast food to shopping habits. Crosslisted as ANTH 245.

246. Japanese Culture and Society (I; 3, 0)
Anthropological perspectives and contemporary Japan; cultural origins, variations within Japanese culture; aspects of social organization, culture, and personality. Crosslisted as ANTH 246.

247. Japanese Film as Anthropology (I; 3, 0)
The use of Japanese film as a key to understanding both the intricacies of Japanese culture and society, and the perspective of anthropology. Crosslisted as ANTH 247.

248. International Relations in East Asia (II; 3, 0)
International relations in East Asia from the treaty-port system to the post-Cold War order, with emphasis on post-WWII and contemporary developments.

249. Inside the Japanese Corporation (I or II; 3, 0)
Ethnographic approaches to the study of the Japanese corporation. A critical examination of industrial familialism, the lifetime employment system, and the work ethic. Crosslisted as ANTH 249.

251. Buddhism (II; 3, 1)
An interdisciplinary introduction to Buddhism, including basic teachings of liberation from suffering, impermanence, no-self, ethics, and meditation. Also explores the historical development of various streams of Buddhism in Asia and the West, with attention to the effect of Buddhism on society, politics, and material culture. Crosslisted as RELI 200.

252. Religions of China (I; 3, 0)
An introduction to the religious traditions of China through study of their origins, basic beliefs, practices and values, historical development, as well as their interaction and involvement with politics, culture, society and each other. Focus on the three major traditions – Confucianism, Daoism, and Chinese Buddhism. Crosslisted as RELI 245.

253. Religions of Japan (II; 3, 0)
An introduction to the religious traditions of Japan through study of their origins, basic beliefs, practices and values, historical development, as well as their interaction and involvement with politics, culture, society and each other. Focus on Shinto and the various forms of Japanese Buddhism. Crosslisted as RELI 246.

254. From Shinto to Shogun: Pre-modern Japan (I or II; 3, 0)
The course will examine the cultural and institutional developments which constitute the Japanese heritage, with emphasis on classical Heian and early medieval court culture and late medieval samurai society. Crosslisted as HIST 295.

255. Modern Japanese History (II; 3,0)
Japanese economy, society, politics, war, and diplomacy from 1868 to World War II; successes, crises, and conflicts in building a modern nation-state. Crosslisted as HIST 296.

256. Contemporary Japanese History (II; 3, 1)
Political and cultural history of post-World War II Japan using various sources including film, anime, art, political cartoon, popular song. May be crosslisted as HIST 299.

261. Music of Asia (AII; 3, 0)
A multicultural approach to the diversity of folk and art music across the largest continent. Music of China, Southeast Asia, Indonesia, India, and Japan. Crosslisted as MUSC 261.

262. Sources of Asian Tradition (II; 3, 0)
An introduction to selected texts illustrative of the cultural and literary traditions of India, China, Korea, and Japan.

266. Chinese Philosophy (I; 3, 0)
Major philosophical schools of the classical age, Buddhist philosophy, Neo-Confucianism. Crosslisted as PHIL 266.

267. The People's Republic of China (II; 3, 0)
A historical look at life in China under the rule of the Communist Party. Unprecedented triumphs and tribulations. Crosslisted as HIST 297.

268. Intellectual Conflict in Modern China (II; 3, 0)
China's traumatic intellectual confrontation with the West. Scorn, fear, wonder, excitement, and terrible dissension. From the first 19th-century challenges to the rejection of the Thought of Mao Zedong. Crosslisted as HIST 264.

274. The Greater Chinese Economy (I; 3, 0)
Coverage of topics essential to understanding the ongoing process of economic transition in China, while emphasizing China's role in the Asian and world economies. Prerequisite: ECON 103. Crosslisted as ECON 274.

277. Social Darwinism East and West (AII; 3, 0)
Darwin's evolution revolution on the rampage, in the religious, philosophical, social, and political thought of England, the United States, and China. Crosslisted as HIST 269.

278. Asian Economic Development (I; 3, 0)
Analysis of contemporary economic development in Asia, focusing on the role of public policy, international trade and investment, and on prospects for future growth. Prerequisite: ECON 103. Crosslisted as ECON 278.

295. Topics in East Asian Studies (I or II; R; 3, 0)
Topics vary.

Seminars and Independent Study

321 and 322. Independent Study (I or II; R; 3, 0)
Open to East Asian studies majors who wish to pursue individual programs of reading, research, or writing. Prerequisite: permission of the instructor.

339. China and the World Economy (I; 3, 0)
An analysis of economic transition and development in China, with emphasis on its role in the Asian-Pacific and world economies. Prerequisites: ECON 256 and ECON 257, or permission of the instructor. Crosslisted as ECON 339.

340. Comparative Pacific Basin Economics (II; 3, 0)
Contemporary developmental issues facing selected Pacific Basin economies, emphasizing international trade, foreign investment, and public policies. Prerequisite: ECON 256, ECON 257, or permission of the instructor. Crosslisted as ECON 340.

369 and 370. Seminar in East Asian History and Culture (I and II; R; 3, 0)
A multidisciplinary Capstone Seminar for Japanese and East Asian studies majors: I. bibliography, sources, and disciplinary approaches to East Asia; II. individual and group studies of selected topics.

Chinese Language (CHIN)

101 and 102. Chinese I (I and II; 5, 0)
Intensive introduction to spoken and written "Mandarin" Chinese, the puutonghuah (common language) of modern China. CHIN 101 is a prerequisite for CHIN 102.

103 and 104. Chinese II (I and II; 5, 0)
Continued rigorous study of spoken and written "Mandarin" Chinese now called puutonghuah (the common language). Prerequisite: CHIN 102 or equivalent for CHIN 103. CHIN 103 or equivalent for CHIN 104.

201 and 202. Chinese III (I and II; 3, 0)
Continued study of modern "Mandarin." Contemporary essays, movie scripts, short stories, and newspaper articles. Equal emphasis on reading and speaking. Conducted in Chinese. Prerequisite: CHIN 104 or equivalent for CHIN 201. CHIN 201 or equivalent for CHIN 202.

203 and 204. Chinese IV (I and II; 3, 0)
Reading and discussion of selected modern Chinese texts: newspaper and magazine articles, essays, short stories, and film scripts. Conducted in Chinese. Prerequisite: CHIN 202 or equivalent for CHIN 203. CHIN 203 or equivalent for CHIN 204.

210. Business Chinese (I or II; 3, 0)
An advanced-level Chinese language course that aims to teach students how to read and write business-related texts with vocabulary and phrases specialized for business related reports. Course materials include case studies of global corporations that have established themselves in China as well as historical background about the Economic Reform and the Open Door Policy which started in 1978. Prerequisites: CHIN 201 and permission of the instructor.

301 and 302. Chinese V (I and II; 4, 0)
Study of Chinese films and film scripts and an introduction to Classical Chinese. Besides reading and speaking, interpreting and writing essays are emphasized. Prerequisite: CHIN 204 or equivalent for CHIN 301. CHIN 301 or equivalent for CHIN 302.

310. Advanced Seminar in Chinese Studies (I and II; 3, 0)
Selected topics in Chinese studies. In Chinese. Course topic varies. Prerequisite: permission of the instructor.

319 and 320. Independent Studies in Chinese (I and II; 3, 0)
Independent projects conducted in Chinese in the student's area of special interest. Prerequisite: permission of the instructor.

Japanese Language (JAPN)

101 and 102. Japanese I (I and II; 5, 2)
Beginning language skills. Training in speaking and comprehending the basic sentence patterns of modern Japanese. Introduction to reading and writing. Prerequisite: JAPN 101 is prerequisite for JAPN 102.

103 and 104. Japanese II (I and II; 5, 2)
Continued training in the four language skills. Review of basic and introduction to complex sentence patterns. Reading of texts in basic Japanese. Prerequisite: JAPN 102 or the equivalent for 103. JAPN 103 is prerequisite for JAPN 104.

201 and 202. Japanese III (I and II; 5, 1)
Application of the four language skills. Reading of texts written in standard Japanese and exercises in content-controlled conversation. Prerequisite: JAPN 104 or equivalent for JAPN 201. JAPN 201 is prerequisite for JAPN 202.

203 and 204. Japanese IV (I and II; 4, 0)
Continued application of the four language skills. Reading and guided discussion of texts related to a variety of topics. Prerequisite: JAPN 202 or the equivalent for JAPN 203. JAPN 203 is prerequisite for JAPN 204.

301 and 302. Japanese V (I and II; R; 4, 0)
Reading and discussion of selected materials. Exercises in the research skills of writing and presenting reports in Japanese. Prerequisite: JAPN 204 or the equivalent for JAPN 301. JAPN 301 is prerequisite for JAPN 302.

319 and 320. Independent Studies in Japanese (I and II; R; 3, 0)
Independent projects conducted in Japanese in the student's area of special interest. Prerequisite: permission of the instructor.

Economics (ECON)

Professors: Winston H. Griffith, Peter Karl Kresl, Jean A. Shackelford

Associate Professors: Wei Ge, Thomas C. Kinnaman, Janet T. Knoedler (Chair), Gregory A. Krohn, Christopher S.P. Magee, Michael Moohr, Geoffrey E. Schneider, Nancy E. White, Amy M. Wolaver

Assistant Professors: Nina E. Banks, David Kristjanson-Gural, Ranga S. Murthy (visiting), Fatma G. Unal (visiting)

The study of economics, as with the other social sciences, attempts to explain various types of human behavior and the impact that society's institutions have in determining that behavior. Of particular interest are the forces that determine an economy's production, employment, distribution of income, poverty, and international economic relationships.

Economics at Bucknell is also an integral part of the liberal arts. The department's primary goal is to cultivate patterns of inquiry that produce economic literacy, independent thinking, and a commitment to lifelong learning and a socially responsible life.

A major in economics offers a background for careers in law, journalism, finance and consulting, government and international affairs, teaching, industrial relations, public service, and many others. The major also provides the essential first stage for students interested in graduate work in economics, and a solid foundation for the graduate study of business and the law.

The **major** in economics consists of a minimum of eight courses in economics, in addition to one semester of calculus (such as MATH 192 or MATH 201) and one semester of statistics (such as MATH 216). ECON 103 is required along with two courses in neo-classical economics (ECON 256 and ECON 257) and ECON 258 Intermediate Political Economy. Students also are required to take a minimum of two economics courses above the 200 level. CAPS courses offered by the department also may qualify for 200-level economics credit. The department chair will determine whether economics AP credit will

count toward the major and minor. Selection of the remaining economics courses needed to fulfill the major requirement will be planned with the assistance of a departmental adviser. ECON 100 does not count toward the economics major.

No more than two course credits earned off campus may be used to meet the economics requirements. This restriction does not apply to transfer students; in addition, all economics courses taught by, or sponsored by Bucknell faculty members in the Bucknell *en España*, Bucknell *en France*, Bucknell in Barbados, or Bucknell in London programs will count toward the major and the minor. With the exception of these Bucknell-sponsored programs, courses taken off-campus normally may not substitute for one of the core course requirements or for one of the two 300-level courses. The department chair may allow an exception if provided with clear information about the character and quality of off-campus courses, and if these courses adequately substitute for material that would be taught on-campus.

Each academic year, the department will solicit applications from all potential majors. When the number of applications reaches above the threshold of 100, criteria for acceptance to the program will emphasize academic achievement.

Students interested in pursuing postgraduate work in economics upon graduation from Bucknell are strongly encouraged to take the following mathematics courses: MATH 201 Calculus I, MATH 202 Calculus II, MATH 211 Calculus III, MATH 216 Statistics I, MATH 303 Probability, and MATH 304 Mathematical Statistics. Other mathematics courses (for example, MATH 213 Elementary Linear Algebra; MATH 212 Differential Equations) are also helpful. In addition, students preparing for graduate study in economics should strongly consider taking ECON 341 Econometrics and ECON 335 Mathematical Economics. Please see the economics department graduate school adviser as early in your degree program as possible for additional information and guidance.

The **minor** in economics consists of ECON 103 plus four elective economics courses at the 200 level or above. Students in other off-campus programs may count one off-campus course toward the minor. No particular combination of courses is required and students may wish to consult individual faculty members about course selection.

100. Economics Transfer Credit
Course credit in certain cases involving AP credit or transfer courses. The department chairperson assigns this credit when appropriate.

103. Economic Principles and Problems (I and II; 3, 0)
General introduction to both macroeconomics and microeconomics, along with an introduction to economic history, international economics, and political economy. The course also examines the origin of economic ideas in the works of Adam Smith, John Maynard Keynes, Karl Marx, and others.

104. Topics in Economics (II; R; 3, 0)
Specific economic problem areas will be discussed in depth.

201. Independent Study (I or II; R; 3, 0)
Individual study or project supervised by a member of the economics department typically resulting in the production of a long research paper. Prerequisites: ECON 103 and permission of the instructor.

221. Money and Banking (II; 3, 0)
An examination of the role of money and the financial system in our economy, including the impact of Federal Reserve monetary policy. Prerequisite: ECON 103. Not open to students who have taken or plan to take ECON 328. Normally not open to students who have taken ECON 257.

222. Economic Topics (I or II; R; 3, 0)
Selected issues in economic theory or policy. Prerequisite: ECON 103 or permission of the instructor.

227. International Economics (I; 3, 0)
An examination of international economic relations today and of the theory used to analyze those trade and financial relations. Attention is given to the problems of government policy with respect to international issues. Prerequisite: ECON 103 or permission of the instructor. Not open to economics majors, who are advised to enroll in ECON 327, or students who have taken ECON 327.

231. Resources and the Environment (I; 3, 0)
This course will develop economic concepts to explain why well-intentioned individuals so often choose to abuse their own environment and stock of natural resources and suggest and evaluate policies designed to remedy the situation. Prerequisite: ECON 103 or permission of the instructor.

235. African Economic Development (I; 3, 0)
A historical, institutional analysis of Sub-Saharan African economic, social, and political development. Primary emphasis will be on the analysis of the economic crisis facing the subcontinent since the late '70s and the structural adjustment programs that have been instituted to deal with the crisis. Prerequisite: ECON 103.

236. Unemployment and Poverty (I or II; 3, 0)
A study of the causes of unemployment and poverty in the United States and policies to generate full employment and eliminate poverty. Prerequisite: ECON 103 and/or permission of the instructor.

237. Health Politics and Health Policy (I; 3, 0)
History of health care delivery and financing in the United States and introduction to and evaluation of current topics in health policy. Prerequisite: ECON 103 or permission of the instructor. First or second year standing, others by permission.

238. Urban Economics (I or II; 3, 0)
Study of household and business location decisions and public policies aimed at congestion, pollution, and crime. Prerequisite: ECON 103. First or second year standing, others by permission.

240. Economics and Technology (I or II; 3, 0)
This course examines the causes and consequences of technological change on the economy, both in sweeping historical terms and in the specific context of some new technologies, with particular emphasis on the great theoreticians of economics and technology, on the path-dependent nature of technological change, and on some of the technological issues – both microeconomic and macroeconomic – that confront us as we enter the next century.

252. Political Economy of Global Resources (I or II; 3, 0)
A study of environmental and energy economics in the context of global resources and politics. The theme of sustainable development will be linked to the new realities of international relations. Prerequisite: ECON 103. Crosslisted as IREL 252 and UNIV 252.

256. Intermediate Microeconomics (II; 3, 0)
Intermediate economic theory of the consumer, the firm, market structures, and resource allocation. Prerequisite: ECON 103.

257. Intermediate Macroeconomics (I; 3, 0)
The study of national income, employment, inflation, interest rates, and the impact of monetary and fiscal policy on the economy. Prerequisite: ECON 103.

258. Intermediate Political Economy (I or II; 3, 0)
Intermediate study of Marxist and institutionalist political economy. The ideas of Marx and Veblen applied to such matters as the distribution of income and power, the environment, working conditions, consumerism, and race and gender issues. Prerequisite: ECON 103.

266. Political Economy of the Caribbean (II; 3, 0)
The development of the Caribbean from colonial times to the present. A look at the social, political, and economic development of the Caribbean as a whole rather than as independent aspects of development.

271. The British Economy: Structures and Policies (I or II; 3, 0)
Offered as an option for Bucknell in London students. This course will treat a distinct topic relating to British economic affairs.

275. Canadian-American Economic Relations (I; 3, 0)
A study of the trade, investment, social, and cultural linkages between the industrial world's most closely related societies. Is this relationship liberal internationalism or dependency? Prerequisite: ECON 103 or permission of the instructor.

276. Latin American Economic Development (II; 3, 0)
A historical analysis of Latin America's economic and political development. Primary emphasis on the experiences of Argentina, Brazil, Chile, Mexico, and Central America. Prerequisite: ECON 103.

277. The French Economy: Structures and Policies (II; 3, 0)
Analysis of government planning since 1945. The conflict of liberal and socialist ideologies today. Prerequisite: Bucknell *en France* students only.

278. Asian Economic Development (I; 3, 0)
Analysis of contemporary economic development in Asia, focusing on the role of public policy, international trade and investment, and on prospects for future growth. Crosslisted as EAST 278. Prerequisite: ECON 103.

279. Economics of Transition (II; 3, 0)
A study of the economies transitioning from centrally planned to market-based. Focus on the comparative experience and performance of China, USSR/Russia, and Eastern European countries. Prerequisite: ECON 103.

280. Political Economy of Media and Advertising (I or II; 3, 0)
Examines the interrelationship of cultural, political, and economic aspects of media content and advertising from the perspective of Institutional and Marxian political economy. Prerequisite: ECON 103 or permission of the instructor.

299. Teaching Assistant in ECON 103 (I or II; 3, 0)
This course can only be taken by economics majors who have permission. Prerequisites: ECON 256, ECON 257, and ECON 258 and permission of the instructor.

301. Independent Study (I or II; R)
Individual study or project, supervised by instructor. Prerequisites: ECON 256, ECON 257, or ECON 258 and permission of the instructor.

302. Honors Thesis in Economics (I; R; 3, 0)
Individual research, leading to an honors thesis in economics, undertaken by qualified students, and supervised by an instructor in the department of economics. This course may be repeated for credit for a second semester for those students completing the honors thesis in economics. Prerequisites: ECON 256, ECON 257, ECON 258, and permission of the instructor and University Honors Council.

305. Comparative Economic Systems (I or II; 3, 0)
A critical analysis of the organization of economic systems. The characteristics of selected capitalist and socialist economics studied and assessed from both mainstream and Marxian analytical perspectives. Prerequisite: ECON 258 or permission of the instructor.

311. Labor Economics (I or II; 3, 0)
An examination of economic models related to labor markets, current labor market trends, and the influence of related government policies. Prerequisites: ECON 256 and one semester of statistics.

312. Health Economics (II; 3, 0)
Theoretical and empirical examinations of issues in health economics. Course includes semester-long research project on a health topic. Prerequisites: ECON 256 and one semester of statistics or permission of the instructor.

313. Public Finance (II; 3, 0)
An analysis of the government's role in the economy. Topics include the economic rationale for government, expenditure analysis, and the allocative and distributive consequences of taxation. Prerequisites: ECON 256. It is strongly recommended that students have one semester of statistics.

317. Economic Integration in Western Europe (I and II; 3, 0)
Study of the European community/union: its policies regarding the integration process, its possible expansion, and the experiences of its member nations. Prerequisites: ECON 227 or ECON 327 and permission of the instructor.

318. American Economic History (I and II; 3, 0)
An examination of the development and influence of American economic institutions from colonial to current times. Prerequisites: ECON 256 and ECON 257, or permission of the instructor.

319. Economic History of Women in the United States (I; 3, 0)
Examination of the history of women in the U.S. economy, with particular attention to racial-ethnic and class differences among women. Both neoclassical economics and political economy are utilized to analyze the economic status of women. Prerequisites: ECON 256, or ECON 257, or ECON 258, and permission of the instructor.

324. European Economic History (I; 3, 0)
Development of the market economy and its major institutions. The changing place of the economy in society. Prerequisites: ECON 256, ECON 257, ECON 258, and/or permission of the instructor.

326. History of Economic Thought (I; 3, 0)
Discussion of original sources of economic ideas. Readings in Smith, Malthus, Ricardo, Mill, Marx, Jevons, Keynes, and others. Prerequisites: ECON 256 and ECON 257, and/or permission of the instructor. Not open to students who have taken or plan to take ECON 407 The Idea of Capitalism in Economic Thought.

327. International Economic Theory (I; 3, 0)
Theoretical principles underlying international trade, investment, commercial policy, economic integration, adjustment mechanisms, and balance of payments policy will be examined with an application of these principles to current national and international policies. Prerequisites: ECON 256 and ECON 257, or concurrent enrollment. Not open to students who have taken ECON 227.

328. Money and Financial Institutions (II; R; 3, 0)
An analysis of the role of the financial system in the U.S. economy. Topics include determinants of asset prices, risk management, and financial regulations. Prerequisites: ECON 256 and ECON 257 or concurrent enrollment and one semester of statistics. Not open to students who have taken ECON 221.

330. Law and Economics (II; 3, 0)
This course examines several areas of law from the "Law and Economics" perspective and analyzes the assumptions that underlie this approach to law. Property rights law, contract law, and tort law will be covered. Prerequisite: ECON 256.

331. Industrial Organization Economics (I; 3, 0)
Topics include market structure, industrial concentration, firm conduct, mergers, advertising, market performance, examined in the context of U.S. antitrust policy. Prerequisite: ECON 256.

333. Seminar in Economic Topics (I or II; R; 3, 0)
Guided discussion of economic issues. Topics to be announced at time of preregistration. Prerequisite: permission of the instructor.

335. Mathematical Economics (II; 3, 0)
Introduction to mathematical tools, such as differential calculus and matrix algebra, necessary to develop and comprehend modern economic models. Prerequisites: ECON 256 and one semester of calculus. In addition, students with ECON 103 and MATH 202 or its equivalent may be admitted with permission of the instructor.

336. Macroeconomic Policy (I; 3, 0)
A study of the effects of fiscal and monetary policies on economic stability and growth. Current and proposed policies will be analyzed. Prerequisites: ECON 257 and one semester of statistics.

337. International Monetary and Financial Economics (II; 3, 0)
The course covers balance of payments, foreign exchange markets, international monetary systems, the adjustment mechanism, macroeconomic policy in an open economy and monetary integration. Prerequisites: ECON 256 and ECON 257 and ECON 327 or permission of the instructor.

338. Seminar in International Economics (II; R; 3, 0)
This course will examine some of the modern controversies in international economics. We will look at trade and environmental disputes within the World Trade Organization, the effect of international trade on inequality, whether regional trade agreements such as NAFTA are good or bad for the economies involved and for the world economy, the politics behind U.S. trade policies, the IMF and its role in world financial crises, and currency unions or fixed exchange rate regimes as opposed to flexible exchange rates. Students in the class will write papers on these topics and then defend their positions in class debates. Prerequisites ECON 257 or ECON 258.

339. China and the World Economy (I; 3, 0)
An analysis of economic transition and development in China, with emphasis on its role in the Asia-Pacific and world economies. Prerequisites: ECON 256 and ECON 257 or permission of the instructor. Crosslisted as EAST 339.

340. Comparative Pacific Basin Economies (II; 3, 0)
Contemporary developmental issues facing selected Pacific Basin economies, emphasizing international trade, foreign investment, and public policies. Prerequisites: ECON 256 and ECON 257, or permission of the instructor. Crosslisted as EAST 340.

341. Econometrics (II; 3, 0)
The application of statistical methods to quantify and test economic theories, analyze government policies, and forecast economic variables. Prerequisites: ECON 256 and ECON 257, and one semester of statistics, or permission of the instructor.

357. Economic Development (I; 3, 0)
The main theories of development; economic and social dualism; agricultural, industrial, and trade strategies; the use of monetary and fiscal policies in promoting economic development; and the role of less developed countries in the emerging global economy. Prerequisites: ECON 256 and ECON 257 or permission of the instructor.

358. Marxian Economics (I or II; 3, 0)
Examines the implications of class struggle on microeconomic competition, the distribution of value within and between firms, and macroeconomic instability accumulation and crises at the national and international level. Prerequisite: ECON 258 or CAPS 407/411.

407. The Idea of Capitalism in Economic Thought (II; 3, 0)
The rich intellectual thought contributing to the idea of capitalism forms the basis of study for this course. This tradition includes work by economic theorists, policymakers and

commentators; historians; poets, novelists, playwrights, and artists observing the emergence and adaptation and adoption of these ideas. These works will provide the basic texts for study and discussion. Not open to students who have taken or plan to take ECON 326.

GEOG 209 Economic Geography is acceptable for credit as an economics course.

Courses offered occasionally: 223 Approaches to Labor Economics, 274 The Greater Chinese Economy, 334 The Theory of Environmental Policy

Education (EDUC)

Associate Professors: Abra N. Feuerstein (Chair), Sue Ellen Henry, Lynn M. Hoffman, Robert M. Midkiff Jr., Joseph L. Murray, Katharyn E.K. Nottis, Candice Stefanou

Assistant Professors: Amy G. Carney, Russell E. Dennis, Sara W. Fry, Rosaria Gabriele, Sarah MacKenzie, Lori A. Smolleck

Education at Bucknell University is a purposeful blend of social science and professional preparation designed to enhance students' understanding of theories of human development, learning, instruction, and behavior, and their ability to apply this understanding across a multitude of contexts. As such, coursework in education is intended to prepare students to contribute to the improvement and effectiveness of education in their roles as parents, citizens, or educational professionals. This broad conceptualization of education enhances the liberal education of all students while preparing the interested student for teaching in public and private schools.

The major in education varies as a function of the specific degree students are pursuing. Both the bachelor of arts and bachelor of science in education are offered and the requirements within each program are described below. A major in education within either degree program can prepare students to pursue careers in teaching. It also provides the necessary background and preparation for graduate work in an array of disciplines, as well as careers in law, business, and public service.

The bachelor of arts degree with a major in education is designed for students who are interested in studying the process and structure of education and schooling but who are not necessarily interested in pursuing a career in teaching. Students who are interested primarily in obtaining certification in early childhood education or elementary education should pursue the bachelor of science in education degree. Students interested in secondary certification normally seek a degree in the discipline they wish to teach and may either pursue certification only or a dual major in education and the discipline.

Bachelor of Arts. Requirements for the bachelor of arts major in education fall into two categories. First, all students must complete five (5) core courses: EDUC 101; EDUC 201; EDUC 202 (non-credit course); EDUC 362 and one of EDUC 323, 334, 335, 346 or 351. Second, students must complete a minimum of four (4), and no more than eight (8), additional courses in an area of concentration developed in consultation with the adviser, exclusive of EDUC 349, 359, 439, 449, or 459. Areas of concentration may focus on such topics as educational policy, instructional design, human learning and instruction, or school psychology and counseling. Students interested in the bachelor of arts are

encouraged to meet with a member of the department to discuss specific degree requirements.

Bachelor of Science in Education. The bachelor of science in education is designed for those students who have clearly defined professional interests in the field of education and who desire to pursue a career in early childhood or elementary teaching.

Early Childhood Education

The bachelor of science in education with a major in early childhood education requires EDUC 101; EDUC 201; EDUC 202; EDUC 323; EDUC 341; EDUC 342; EDUC 344; EDUC 345; EDUC 346; EDUC 349 and EDUC 449 or one education elective approved by the department chair. (10-12 credits)

Elementary Education

The bachelor of science in education with a major in elementary education requires EDUC 101; EDUC 201; EDUC 202; EDUC 341; EDUC 342; EDUC 343; EDUC 344; EDUC 345; EDUC 346; EDUC 349; and EDUC 449 or one education elective approved by the department chair. (10-12 credits)

Certification Requirements for Early Childhood Education or Elementary Education

Students seeking teaching certification in either elementary education or early childhood education must complete EDUC 349. This three-credit course can be taken only if the student demonstrates that all requirements leading to a recommendation for certification have been or soon will be completed. General requirements for certification are described in the teacher certification section.

Students seeking certification in early childhood education are required to take MATH 117, a course in English literature (preferably ENGL 218), MUSC 136, MGMT 101, and PSYC 207 in addition to meeting other certification requirements listed on the education department website (www.bucknell.edu/education).

Students seeking certification in elementary education are required to take MATH 117, ENGL 218, MUSC 136, PSYC 207, one course in art, theatre or dance*, one history course*, one citizenship course*, one family or society course*, and two laboratory science courses* in addition to meeting other certification requirements listed on the education department website (www.bucknell.edu/education).

*Lists of approved courses in these areas are posted on the education department website (www.bucknell.edu/education).

Secondary Education and Teaching Certification

The following table shows the secondary and K-12 certifications offered by Bucknell. Students seeking these certifications also must complete the requirements for the Bachelor of Science or Bachelor of Arts in the discipline listed in the second column.

Certification Area	Required Major
Art (K-12)	Art
Biology (7-12)	Biology
Chemistry (7-12)	Chemistry

Citizenship (7-12)	History, Geography, Political Science, or Economics
Communications (7-12)	English, Theatre, or Education
Earth and Space (7-12)	Geology
English (7-12)	English
Environmental Education (K-12)*	Environmental Studies
Foreign Language (K-12)	
French	French
German	German
Latin	Classics
Russian	Russian
Spanish	Spanish
General Science (7-12)*	See below*
Mathematics (7-12)	Mathematics
Music (K-12)	Music
Physics (7-12)	Physics
Social Studies (7-12)	Anthropology, Economics, Geography, History, Political Science, Psychology, or Sociology

*Requires additional certification in one of the following areas: Biology, Chemistry, Earth and Space Science, or Physics

It is also possible to declare a second major in secondary education. (Please see Academic Policies and Requirements for clarification of degrees and majors.) The bachelor of science in education with a major in secondary education requires eight courses (10 credits), two of which are education electives chosen in consultation with the adviser. All students seeking this degree must meet the requirements for certification in a content area**. Eight courses (nine credits) are required for certification to teach at the secondary level (grades 7-12 or grades K-12): EDUC 101; EDUC 201; EDUC 202 (non-credit course); EDUC 240; EDUC 334 or 335; EDUC 359, EDUC 459** and one of EDUC 343, EDUC 310, EDUC 354, EDUC 355, ENGL 297, LING 241 or MATH 207.

Students seeking secondary teaching certification must complete EDUC 359**, a three-credit course that can be taken only if the student demonstrates that all requirements leading to a recommendation for certification have been or soon will be completed. General requirements for certification are described in the teacher certification section below. Specific requirements may change as mandated by the legislature of the Commonwealth of Pennsylvania. Lists of courses acceptable for meeting specific requirements are available at the departmental office and website.

**Students who cannot or choose not to take EDUC 359 and EDUC 459 should complete the B.A. or B.S. in the content area or consult with the chair of the education department to select appropriate courses to complete a B.A. in education.

General Requirements for Teaching Certification

The department of education provides teacher preparation programs which lead to certification in the Commonwealth of Pennsylvania in early childhood, elementary, and selected content areas in secondary education. Students can prepare to become certified teachers by enrolling in a bachelor of science in education degree program or by taking a bachelor of arts or bachelor of science degree in the content area in which they plan to teach. Independent of the degree program into which a student is admitted to the

University or the area in which a student may wish to teach, a student also must be formally admitted to the Pre-Certification, Initial Preparation Program (Pre-CIP). Admission to Pre-CIP can occur after the student has completed two courses in mathematics*, two courses in English literature or composition*, 12 Bucknell University courses or their equivalent, and achieved for the three preceding semesters an overall grade point average of 3.0 (appeals to this requirement should be made to the chair of the department of education). Application to Pre-CIP is normally made when the students begin considering a career in the field of education and are notified of their acceptance or rejection at the end of their sophomore year.

The Commonwealth of Pennsylvania requires an overall grade point average of 3.0 upon completion of the program prior to recommendation for certification to teach. Specific requirements leading to a recommendation in each teaching area are available at the education department website. It is the responsibility of the student to examine these programs in consultation with a member of the education department. Although members of the department will advise students concerning course selection, the student is responsible for choosing those courses and experiences that meet certification program requirements.

In addition to completing an approved program and successfully demonstrating the prescribed role competencies, to qualify for recommendation for a teaching certificate the student must be a "person of good moral character" and must be a person who "possesses those personal qualities and professional knowledge and skills which warrant issuance of the requested certificate." It is the student's responsibility to satisfy all these criteria. Students should note that prior to placement in student teaching or any other field experience, they will be required to submit results of a child abuse clearance, criminal background check and fingerprinting pursuant to requirements of the Pennsylvania Department of Education. Results must indicate that there are no criminal or child abuse records.

In addition to coursework, students must complete and submit scores from the Praxis examinations to the department of education at Bucknell. Specific examinations required for each area of certification vary. Although members of the department will advise students concerning examinations, the student is responsible for choosing those examinations that meet certification program requirements.

After completing the approved program of courses, the student shall submit to the education department at Bucknell an application for a Pennsylvania teaching certificate. Following a review of the student's program, the student may be recommended for certification by the designated officer at Bucknell, who is the associate dean for Academic Affairs in the Office of the Provost. As noted above, the student must take all the competency tests required by the Commonwealth of Pennsylvania and receive a passing score.

Students who desire certification in states other than Pennsylvania must understand that teacher certification is governed by state law and that each state has different requirements. Simply obtaining a Pennsylvania teaching certificate, by completing an approved program and meeting all other requirements, does not ensure a student that she or he will be certified in another state. Although members of the Bucknell education department will assist students in obtaining information concerning certification in other states, as well as

Pennsylvania, it is the student's responsibility to obtain this information and to meet all the certification requirements of any state.

*Exceptions to these requirements will be posted on the education department website: www.bucknell.edu/education

Student Teaching

The education department is responsible for the professional preparation of future teachers. To ensure that future professionals are competent, the privilege of taking the course in student teaching (EDUC 349, 359 or 439) is restricted to students whose cumulative grade point average through the junior year is 3.0 or better. Additional requirements for all student teachers are good health, character, personality, and acceptable spoken and written English. Placement in student teaching is contingent upon acceptance of the student by an elementary or secondary school that has been approved by the Bucknell education department. Students must complete an application for student teaching **by November 1 of the junior year**. This application is to be made from the education department website. In addition, students are responsible for obtaining transportation to the placement. Also, the education department reserves the right to specify the semester during which a student is permitted to enroll in student teaching.

All students who are interested in student teaching must apply to the Pre-CIP Program no later than the first semester of the junior year.

Minor in Education

The **minor** in education consists of five courses chosen from among the departmental offerings. The student is encouraged to choose courses within a particular area of specialization that is of interest to him or her. Such areas of specialization include, but are not limited to, teaching of reading, early childhood education, research and evaluation in education, educational policy studies, employee training and development, college student personnel, family studies, and counseling. Recommended clusters of courses for particular areas of specialization are available on the departmental web page.

101. Social Foundations of Education (I and II; 3, 0)
Historical, economic, philosophical, and social foundations of education, and their implications for present-day education in America. Provides a background of information for the prospective teacher and citizen. Not open to seniors.

201. Educational Psychology (I and II; 3, 0)
Role of psychological concepts in educational practices. Nature, sources of individual differences in development and readiness. Learning theory, motivation, and emotion in learning. Issues in identifying and supporting the learning of all students. Measurement and evaluation of learning.

202. Educational Psychology Practicum (I and II; 0 2) No credit.
This course is a required course for all certification students and involves observation of teachers and classrooms in local schools and associated assignments. This course was developed from the field experience formerly included in EDUC 201 Educational Psychology. This course does not represent an additional requirement, but rather the renaming of an existing field placement. Prerequisite or corequisite: EDUC 201.

240. Literacy and Learning in the Diverse Classroom (II; 3, 0)
Students explore how diverse adolescents develop abilities to decode, interpret, and use language and mathematical sign systems to gain access to secondary school content knowledge. Students also analyze structures and tools of inquiry embedded in secondary school subjects. Other topics: curriculum integration, strategies for literacy development, learning disabilities that impact literacy, and teaching and learning of English Language Learners. Required fieldwork. Prerequisites: EDUC 101 and EDUC 201.

290. Gender Issues in Education (II; 3, 0)
An examination of how gender affects the teaching – learning process with an emphasis on theory, curriculum, pedagogy, and assessment. Prerequisite: EDUC 201 or permission of the instructor.

301. Applied Behavioral Psychology (I, S; 3, 1)
Strategies for problem solving in educational institutions, mental health facilities, and industry with an emphasis on data-driven decision-making and positive intervention. Problems considered will focus on motivation, design of instructional systems, and human communication. Field experience required.

305. Advanced Educational Psychology (I; 3, 0)
Both the theories and practical applications of psychology applied to cognitive, social, and emotional learning are emphasized. Additionally, the research process used to study learning is a major focus of attention. Prerequisite: EDUC 201 or permission of the instructor.

308. Philosophy of Education (II; 3, 0)
Systematic analysis of the work of representative Western philosophers on education, including Plato, Aristotle, Rousseau, Kant, and Dewey. Focuses on epistemological, metaphysical, and methodological issues. Prerequisite: permission of the instructor.

309. Supervision of Personnel (II or S; 3, 0)
A systematic course in the selection and supervision of personnel and staff development. Analysis and critique of various supervisory models, methods of supervision and evaluation and relevant research. Prerequisite: permission of the instructor.

312. Counseling Techniques (I; 3, 4)
This course provides an introduction to counseling theory and training in micro-skills of counseling and interviewing. Students have an opportunity to practice a wide range of counseling techniques with videotaping. Required field placement or service learning experience.

314. School Psychological Services (I or II; 3, 0)
An overview of psychological services as provided by school psychologists and counselors. This course specifically addresses collaborative consultation, theory and practice in the school environment on individual and systems levels. Required fieldwork. Preference given to juniors and seniors.

315. Senior Thesis (I or II)
Open to qualified seniors. Prerequisite: permission of the department.

316. Teaching in Diverse Environments (II; 3, 2)
Supervised practice in the design and implementation of instruction in non-traditional learning environments. Emphasis on theory informing practice. Prerequisite: permission of the instructor.

317. Problems in Education (I or II; R; 2-4, 0) Half to full course.
Research on a problem not involved in a student thesis. Upperclass students. Prerequisites: three courses in education or permission of the instructor.

318. Multiculturalism and Education (II; 3, 0)
This course combines social science and educational research with narrative accounts to explore the historical, philosophical, sociological, and political foundations of the multicultural movement in American education. The course will examine and critique contemporary issues such as the educational experiences of minority groups, inclusive pedagogy, and bilingual education.

319. Group Processes (II; 3, 0)
This course provides an overview of the basic dynamics, theoretical components, and developmental aspects of small groups with clients in educational settings. Students participate in a variety of group interventions as both a group leader and a group member. Required fieldwork. Prerequisite: junior or senior status.

322. Psychology of the Exceptional Child (II; 3, 0)
Understanding the psychology of the exceptional child from childhood through adolescence. Focused involvement in building an understanding of the diverse ways cognitive disabilities are manifested in children and adolescents with an emphasis on prevention, intervention and remediation. Optional fieldwork. Prerequisite: permission of the instructor.

323. Education of Young Children (II; 3, 4)
A conceptual-developmental overview of the social, emotional, cognitive, and physical characteristics of the early childhood years (to age 9) stressing extrapolation from developmental theory to educational practice for teachers and parents who function as the earliest educators.

325. Career Development (S; 6, 0)
An examination of career decision making and career choices within the context of cognitive, social, emotional, and physical development, with emphasis on both theory and practice. Prerequisite: permission of the instructor.

328. Tests and Measurement (I; 3, 0)
Introduction to the fundamental concepts of measurement and testing theory with emphasis on the application of those concepts in a variety of educational, psychological, and employment settings. Prerequisite: permission of the instructor.

331. Investigation in International Issues (S; 3, 0)
Case studies of education issues through a supervised field placement in an international setting. Part of a Bucknell international studies program. Prerequisite: Open only to students enrolled in the Bucknell in Northern Ireland program or permission of the instructor. Crosslisted as PSYC 231 or SOCI 331.

334. Later Childhood and Adolescence (I and II; 3, 4)
Uses theory, case studies, and field experience to illustrate early and later adolescent development. Required fieldwork. Not open to students who have taken EDUC 335.

335. Child and Adolescent Development (I; 3, 4)
Social, emotional, cognitive, and physical development from age 5 to 18 in relation to the educational environment, including the interaction of the child with family, adults, and peers. Required fieldwork. Not open to students who have taken EDUC 334.

341. Early Literacy (I; 3, 4)
A study of the strategies and techniques involved in teaching children to read and to write (K-6 level). Contemporary theories of reading behavior. Required fieldwork. Prerequisites: EDUC 101 and 201.

342. Differentiation and Diversity in Education (I; 3, 4)
Differential instruction and cultural awareness to foster the learning of all students in inclusive classrooms. Adaptations for reading, writing, spelling, and mathematics included. Required field work. Prerequisite: EDUC 341 or EDUC 240 or permission of the instructor.

343. Teaching of Social Studies (I and II; 3, 0)
Consideration of special problems arising in teaching social studies in elementary and secondary schools. Influences determining course content, including state and national standards. Prerequisites: EDUC 101, 201 and either 323, 334, 335, or 346 or permission of the instructor.

344. Science as Inquiry (I; 3, 4)
This course reflects best practices for the teaching of science as outlined in the *National Science Education Standards* and the *PA State Standards*. This course provides students with instructional methods and curricular materials appropriate for teaching science concepts, processes, and skills to young children. Teaching science as inquiry will serve as the foundation for the course. Prerequisites: EDUC 201 and EDUC 341.

345. Curriculum Planning in Elementary Education (II; 3, 0)
Processes of curriculum development and improvement from descriptive and normative perspectives. Alignment of classroom instruction with standards. Integration of curricular content across subject areas. Not open to students who have taken EDUC 352. Prerequisite: EDUC 201.

346. Literacy Across Contexts (II; 3, 4)
Principles of creating a developmentally appropriate elementary learning environment. Emphasis is placed on the process of designing instruction appropriate for learners at various levels of cognitive, emotional, and social development. Language arts and its domains will be used to illustrate, explain, and extend course concepts. Issues related to student motivation and classroom management also will be examined. Required fieldwork. Prerequisites: EDUC 101, 201, 341, and PSYC 207 or permission of the instructor.

349. Student Teaching Elementary (I and II; 0, 35) Three courses.
Supervised practice in the design and implementation of instruction in elementary school classrooms. Emphasis on professional conduct and use of theory to inform practice. Prerequisites: senior status, acceptance into Pre-CIP, all required certification courses, or permission of the instructor. Corequisite: EDUC 449.

350. Higher Education in the United States (I; 3, 0)
Overview of historical and contemporary trends in post-secondary education: systematic examination of selected social, political, economic, and educational forces and problems affecting contemporary higher education.

351. Learning and Development in Postsecondary Education (I; 3, 0)
Investigation of contemporary theories pertaining to the processes of learning and development that occur from later adolescence through old age.

354. Teaching of Art (I; 3, 4)
Principles and practices of teaching art in grades K-12. Interested students should meet with the chair of the department of education no later than March 15 of sophomore year. Prerequisites: EDUC 101, 201 and 335 (preferred) or 334.

355. Teaching of Science in Secondary School (II; 3, 4)
Principles and practices of teaching biology, chemistry, physics, earth and space science, and environmental science in grades 7-12. Prerequisites: EDUC 101, EDUC 201, and EDUC 334 or EDUC 335 (EDUC 335 preferred for environmental science).

357. Teaching and Learning Science (S; 3, 0)
This course will reflect best practices for the teaching of science as outlined in the National Science Education Standards and the Pennsylvania State Standards. Not open to students who have taken EDUC 344.

359. Student Teaching: Secondary (I and II; 0, 35) Three courses.
Supervised practice in design and implementation of instruction in secondary school classrooms. Emphasis on professional conduct and use of theory to inform practice. Prerequisites: senior status and permission of the instructor. Corequisite: EDUC 459.

362. Research Methods I (II or S; 3, 0)
This course emphasizes the design of experimental research and the development of skills in analyzing and interpreting data. Experimental research in education and psychology is critiqued in terms of theory, past research, hypothesis generation, and research design. Data analysis involves the use of the statistical packages such as SPSS, which are broadly applicable to the social and psychological sciences.

370. Public School Law (S; 3, 0)
Examination of federal and state constitutional and statutory influences on public schools. Emphasis is placed on Pennsylvania statutes, regulations, and judicial decisions affecting teachers and students.

375. Methods of Teaching English as a Second Language (II; 3, 0)
This course focuses on preparing to teach students for whom English is their second language (ESL). It focuses on three primary areas: instructional materials development for ESL; assessment and support of ESL students; and cultural awareness and sensitivity.

385. Topics in Education (I or II; 3, 0)
Topics vary but typically focus on the relationship between education and society.

398. Student Affairs Programs in Higher Education (II; 3, 0)
The study of historical and philosophical foundations of the student affairs profession and the roles and functions of student affairs professionals in contemporary collegiate

institutions. Prerequisite: EDUC 334 or EDUC 351(recommended), or permission of the instructor.

420. Ethics in Education (I or II; 3, 0)
Application of traditional and contemporary ethical theories to current dilemmas in teaching, research, counseling, administration, and educational policy.

439. Student Teaching in Music (I or II; 0; 35) Three courses.
Corequisite: MUSC 236. Prerequisite: permission of the instructor.

449. Professional Seminar in Elementary Education (I and II; 3, 0)
Systematic approach to the observation, interpretation, verification, and remediation of problems affecting student learning. Psychological and sociological theory informing teaching practice. Implications of student diversity for adaptation of instruction. Prerequisites: EDUC 342, senior status, and permission of the instructor. Corequisite: EDUC 349.

459. Professional Seminar in Secondary Education (I and II; 3, 0)
Systematic approach to the observation, interpretation, verification, and remediation of problems affecting student learning. Psychological and sociological theory informing teaching practice. Implications of student diversity for adaptation of instruction. Prerequisites: senior status and permission of the instructor. Corequisite: EDUC 359.

484. Local Educational Politics (II; 3, 0)
This course introduces students to a variety of philosophical, political, and sociological theories that explain the nature of conflict in the educational arena.

Methods courses offered by other departments: ENGL 297 Teaching of English; LING 241 Teaching Foreign Language; MATH 207 Teaching of Mathematics in Secondary Schools

Courses offered occasionally: EDUC 228 Education and Family, EDUC 353 American Educational Theory in the 21st Century, EDUC 432 Legal Aspects of Education

English (ENGL)

Professors: Greg J.H. Clingham, Saundra K. Morris, John S. Rickard, Harold Schweizer (Chair)

Associate Professors: Paula Closson Buck, Glynis Carr, Carmen Gillespie, Ghislaine G. McDayter, Jean Peterson, Harriet Pollack, Meenakshi Ponnuswami

Assistant Professors: Christopher A. Camuto, Mara deGennaro, Michael J. Drexler, Eric S. Faden, Sherri Geller, Shara M. McCallum, James Peterson, Robert A. Rosenberg, Alfred K. Siewers, G.C. Waldrep III, Virginia Zimmerman

The Bucknell English department provides students with opportunities for intensive study in language and literature. Courses in English introduce students to important works of literary art in the English and American literary traditions, to other national and regional literary traditions in English, and to diverse and multicultural voices and traditions. Students in English classes learn to express themselves critically and creatively, developing analytical and communication skills that will serve them well in their other University courses and in their professional lives following their education at Bucknell.

Majors in English find themselves well prepared for graduate school in English and creative writing, for teaching, for law school and other professional schools, and for careers in publishing, management, advertising, and other professions requiring creativity, careful attention to language and critical thinking.

Kinds of Departmental Course Offerings: The department of English offers four kinds of courses, all of which are intended to contribute to the liberal education of students regardless of their majors and to offer a coherent program of study for the student majoring in English:

- Those including considerable emphasis on English composition, along with the study of literature, intended primarily as first-year courses. Not more than two first-year course credits (including advanced placement) can be counted toward a Bucknell degree.
- Those dealing with a specific author, special topic, genre, or period of literature.
- Those dealing with the theoretical and practical nature of criticism, the history of the English language and theories of grammar, the history and analysis of film, and methods of teaching composition and literature.
- Those providing students with the opportunity to develop abilities in creative writing.

The Major in English: The minimum requirement for a major in English is eight courses beyond the 100 level. Students majoring in English must distribute their courses as follows:

- In five periods of English or American literature – Medieval (to 1485); The Renaissance (1485-1660); 18th-century British/Early American; 19th Century; and Modern Literature.
- One designated survey course that studies a body of literature spanning more than one historical period.
- Two seminars.

The English department urges majors to take the designated survey requirement early in their major coursework, as this requirement is designed to introduce students to important questions concerning literary history relevant to the broader concerns of the major. Students who are considering continuing their studies in graduate school are urged to take at least one course in literary theory.

Note: Courses in women's literature, cultural studies minority literature, and literary theory fulfill requirements for historical periods, surveys, or seminars when so organized.

Concentration in Creative Writing: The concentration in creative writing combines the core requirements of the English major with a series of courses in creative writing. This option allows students to learn to write creatively and artistically while encountering models for good writing through the study of literature.

Neither the foundation seminar in creative writing (ENGL 090) nor the multi-genre introductory course (ENGL 106) count toward the requirements for the concentration.

Students electing the concentration in creative writing will take a minimum of eight courses, including:

- A survey course in literature
- One course in literature *before* the 19th century
- One course in 19th-century literature

- One course in 20th-century literature
- ENGL 201 Creative Writing: Topics in Form and Style
- ENGL 202 Introduction to Creative Writing: Fiction or ENGL 203 Introduction to Creative Writing: Nonfiction
- ENGL 204 Creative Writing: Poetry
- One seminar in creative writing

There are three **minors** available in the department of English:

- The English minor in American literature consists of five courses in English above the 100 level. At least three of the five courses must be in the study of American literature. One of the five courses must be a seminar.
- The English minor in British literature consists of five courses above the 100 level. At least three of the five courses must be in the study of British literature. One of the five courses must be a seminar.
- The English minor in Creative Writing requires five courses, four of which must be selected from among the following:

ENGL 201	Topics in Form and Theory
ENGL 202	Creative Writing – Fiction
ENGL 203	Creative Writing – Creative Nonfiction
ENGL 204	Creative Writing – Poetry
ENGL 303	Seminar in Writing Creative Nonfiction
ENGL 308	Seminar in Writing Poetry
ENGL 309	Seminar in Writing Fiction

The fifth course must be a literature class above the 100 level in which fiction, poetry, or creative nonfiction is studied as a genre (e.g., Survey of the Novel, Seminar in Poetry, The Modern Novel, etc.)

Neither ENGL 090 nor ENGL 106 counts toward the minor.

Honors in English: The student, under the guidance of a staff member, undertakes a specifically tailored sequence of courses and independent work culminating in an honors thesis, evaluated by a panel of three faculty members. It is also possible to write a departmental honors thesis without applying for Honors in English. Students writing theses should enroll in ENGL 379 (Senior Thesis) during the semester in which they plan to complete the thesis.

For information on teaching English and communication in secondary school, see Professor Morris.

First-year Courses

90. Foundation Seminar in English (I and II; 3, 0)
This course deals with literary texts as cultural documents shaped by historical, political, religious, and philosophical concerns, as well as by processes of creative imagination. Close attention will be given to the development of students' writing and information retrieval skills. Prerequisite: first-year students only.

98. Myth, Reason, Faith (I or II; 4, 0)
This course, which is also a Foundation Seminar, is designed to introduce students to some of the most significant works in the Western intellectual tradition. Works by major writers from Homer to Dante will be studied. Crosslisted as CLAS 98, HUMN 98, and PHIL 98.

101. Literature and Composition (I and II; 3, 0)
Introduction to the critical study of literature and instruction in composition. First-year students only; others by permission of instructor.

106. Literature and Creative Writing (I and II; 3, 0)
Introduction to creative writing through the reading and writing of poetry and prose (fiction or creative nonfiction). Does not count toward the creative writing concentration or minor. Prerequisite: seniors by permission of the instructor.

107. Introduction to World Literature (I or II; 3, 0)
This course introduces students to literary works from several countries, covering five continents and many cultures. It also provides instruction in composition. Prerequisite: first-year students only; others by permission.

120. Literature and the Environment (I; 3, 0)
Interdisciplinary study of major texts which demonstrate an abiding interest in nature and in cultural and social values concerning the environment.

130. Writing about Film (I or II; 3, 0)
Introduction to film grammar, history, genres, and movements in world cinema using theoretical texts and primary source films. Emphasis on writing and critical thinking skills.

140. Introduction to Women's and Gender Studies (II; 3, 0)
Interdisciplinary introduction to the major theories, themes, methodologies, and issues of women's and gender studies. Emphasis on the humanities. Crosslisted as WMST 140.

150. Art, Nature, and Knowledge (I or II; 4, 0)
Interdisciplinary study of selected works in art, music, literature, science, and philosophy from the Renaissance through the 19th century. Crosslisted as HUMN 150, PHIL 150 and RESC 150.

General Literature Courses

217. Studies in Dramatic Literature (AI, II; R; 3, 0)
Selected movements and topics in drama such as Restoration drama, African American dramatic literature, the Theatre of the Absurd.

218. Studies in Children's Literature (I or II; 3, 0)
Fairy tales, fantasy, animal fables, and tales of adventure from 19th-20th centuries, with a sampling of contemporary films, primarily American.

220. Young Adult Fiction (I or II; 3, 0)
Study of literature that appeals to adolescent and young adult readers, with particular emphasis on British and American fiction and non-fiction prose from the 19th century to the present.

223. Survey of Women's Literature (I or II; 3, 0)
Historical survey of literature by women, from the medieval period to the present; texts drawn from a variety of national traditions in the English language.

226. Irish Literature (I or II; 3, 0)
Introduction to Irish literature, with attention to Irish mythology, history, and politics as they affect Irish art.

227. Caribbean Literature (I or II; 3, 0)
Introduction to selected literature of the Caribbean, with close analysis of text and context.

228. Topics in Gender Studies (I or II; 3, 0)
Topics include constructions of gender identities, homosexualities, GLBT cultures, hate crimes, sexual violence, or activism.

230. Nihilism, Modernism, Uncertainty (I; 3, 0)
Presents major modern figures and concepts, with examples from painting, music, literature, philosophy, and science. Prerequisites: ENGL 98 and ENGL 150. Crosslisted as HUMN 250 and PHIL 250.

280. Modern Literature (I or II; R; 3, 0)
A selective introduction to the varied forms, significant authors, and literary movements from the turn of the century to the recent past.

286. The Modern Novel (I or II; 3, 0)
Selected major novelists (English, Irish, continental, American).

287. Modern Drama (II; 3, 0)
Studies in modern dramatic literature, theatre history, and performance theory.

288. Studies in Contemporary Literature (I or II; R; 3, 0)
An intensive study of selected British and American authors of the past 40 years.

290. Special Topics (I or II; R; 3, 0)
Flexible in subject matter and in method. Topics such as Literature and Psychology, Literature and Myth, Science Fiction.

291. Survey of the Novel (I or II; 3, 0)
Historical survey of the novel as a genre.

298. Introduction to Literary Theory (I or II; R; 3, 0)
The nature and function of literary criticism, theoretical and practical.

299. Survey of English and American Literature (II; 3, 0)
A survey of major authors, texts, concepts, and developments in English and American literature with participation of weekly guest lecturers from the English department.

English Literature Courses
240. Medieval English Literature to 1485 (AII; 3, 0)
Survey of the poetry and prose of medieval England.

243. Chaucer (I; 3, 0)
The major works and language of Chaucer.

250. Renaissance Literature, 1485-1660 (I or II; R; 3, 0)
Survey of the poetry and prose of representative authors, including Spenser and Milton.

251. Studies in Renaissance Literature (I, II; R; 3, 0)
Selected major prose and poetry.

257. Shakespeare (I or II; 3, 0)
Selected plays.

258. Studies in Shakespeare (II; 3, 0)
Studies in such special topics as "Shakespeare and Film," "Shakespeare's History Plays," "Psychoanalysis and Shakespeare."

260. Restoration and 18th-century Literature (II; 3, 0)
Survey of the poetry and prose of representative authors.

261. Studies in Restoration and 18th-century Literature (I; R; 3, 0)
Selected authors and various genres, including the relationship between literature and politics, history, and the sciences.

270. Romantic Literature, 1780-1832 (I; 3, 0)
Examination of selected authors in poetry and prose, read in relationship to contemporary political and cultural influences.

271. Studies in 19th-century English Literature (I, II; R; 3, 0)
Selected major prose and poetry.

283. The Early English Novel (I; 3, 0)
The rise of the novel as a genre, and analysis of representative novels.

284. The 19th-century English Novel (II; 3, 0)
Major developments in the novel as a genre and representative novels.

285. Modern British and American Poetry, 1890-1960 (I or II; R; 3, 0)
Selected major poets of England, the United States, and other English-speaking cultures.

American Literature Courses

205. Early American Colonial Literature (I or II; 3, 0)
Study of American literature from Columbus through the American Revolution.

206. Early American National Literature (I or II; 3, 0)
Study of American literature from the Revolution to the Civil War.

207. American Romanticism (I or II; 3, 0)
Examination of selected texts in various genres, read in their cultural contexts.

208. American Realism and Naturalism (I; 3, 0)
Study of selected texts by American writers from 1865 to 1900.

209. Modern American Literature (II; 3, 0)
Study of selected texts by American writers from 1900 to 1950.

212. Contemporary American Literature (I; 3,0)
Study of selected texts by American writers from 1950 to the present.

213. Special Topics in American Literature (I or II; 3, 0)
Selected special topics in American literature.

214. Nineteenth-century American Women Writers (I or II; R; 3, 0)
Surveys both major and non-canonical writers and explores relationships between gender, reading, and writing, in American cultural contexts.

215. Twentieth-century American Women Writers (I or II; R; 3, 0)
Selected women writers placed in dialogue with one another and with 20th-century American and women's literary traditions.

216. Studies in American Literary Genres (I or II; 3, 0)
Study of a selected genre of texts in American literature.

219. Studies in Selected American Authors (I or II; R; 3, 0)
Authors selected from among Hawthorne, Emerson, Thoreau, Whitman, Dickinson, Cather, Melville, Wharton, James, H.D., Frost, Hemingway, Faulkner, O'Neill, Stein, Welty, O'Connor, and Morrison.

221. African American Literature (I or II; R; 3, 0)
Introduction to selected texts founded upon the Black experience in America.

Courses in Language and Pedagogy
295. The Stories of English (I or II; 3, 0)
The origins and development of the English language.

297. The Teaching of English (I; 3, 0)
Discussion and practice related to the teaching of English in secondary schools. Required for 7th to 12th grade certification in English.

Literature Seminars
Capstone seminars listed as ENGL in the *Schedule of Classes* also satisfy the seminar requirement for the major.

300. Introduction to Graduate Studies (I; 3, 0)
Introduction to graduate study, including literary and critical theory, research, and other elements of literary scholarship. Opened to advanced undergraduates. Prerequisite: permission of the instructor.

301. Seminar in American Literature Topics (I or II; R; 3, 0)
Advanced topics, such as Cross-Cultural Encounters, The American Novel, Gender and American Poetics, and Beat Generation. Prerequisite: permission of the instructor.

302. Seminar in Selected American Writers (I or II; R; 3, 0)
Study of the works of one or more major American writers. Prerequisite: permission of the instructor.

305. Seminar in Early American Literature (I; 3, 0)
Seminar in a special topic or genre of Early American and/or 18th-century American culture. Prerequisite: permission of the instructor.

307. Seminar in 19th-century American Literature (I or II; R; 3, 0)
Seminar in a special topic, author, or genre of 19th-century American literature and culture. Prerequisite: permission of the instructor.

310. Seminar in Modern American Literature (I or II; R; 3, 0)
Seminar in a special topic, author, or genre of modern American literature and culture. Prerequisite: permission of the instructor.

311. Seminar in Contemporary American Literature (I or II; 3, 0)
Seminar in a special topic, author, or genre of contemporary American literature and culture. Prerequisite: permission of the instructor.

319. Individual Projects (I and II; R)
Individual, special projects supervised by instructor; honors thesis. Prerequisite: permission of the instructor.

321. Seminar in African American Literature (I or II; R; 3, 0)
Study of selected thematic, aesthetic, and ideological issues in Black American writing. Prerequisite: permission of the instructor.

323. Seminar in Women's Literature (I or II; R; 3, 0)
Advanced topics investigating relationships between gender, writing, and reading. Prerequisite: permission of the instructor.

326. Seminar in Irish Literature (I or II; R: 3, 0)
Advanced topics in Irish literature, including Irish Women Writers, Nationalism and Literature, and Contemporary Irish Writing. Prerequisite: permission of the instructor.

327. Seminar in Caribbean Studies (I or II; R; 3, 0)
Study of selected thematic, aesthetic, and ideological issues in Caribbean writing.

340. Seminar in Early English Literature to 1485 (I or II; R; 3, 0)
The language and literature of Anglo-Saxon or medieval England. Prerequisite: permission of the instructor.

350. Seminar in Renaissance Literature (I; R; 3, 0)
Special topics. Student reports, oral and written. Prerequisite: permission of the instructor.

358. Seminar in Shakespeare (II; 3, 0)
Special topics. Student reports, oral and written. Prerequisite: permission of the instructor.

360. Seminar in Restoration and 18th-century Literature (I or II; R; 3, 0)
Studies in canonical and marginalized texts, cultural and philosophical formations, and the continuing historical and theoretical relevance of the period. Prerequisite: permission of the instructor.

370. Seminar in 19th-century English Literature (I; R; 3, 0)
Examination of a wide range of poetry and prose by selected authors with emphasis given to the literature's historical and cultural groundings. Prerequisite: permission of the instructor.

378. Thesis Workshop (I; 3, 0)
A colloquium on problems arising from the writing of a scholarly thesis. Prerequisite: permission of the instructor.

379. Senior Thesis (II; 3, 0)
The writing of a scholarly or creative honors or senior departmental thesis. Students must confer with and submit a proposal to an adviser prior to registering for the thesis. Prerequisites: senior status and permission of the instructor.

381. Seminar in 20th-century British Literature (I or II; R; 3, 0)
In-depth study of selected modern authors (such as Yeats, Joyce, H.D., Conrad, Woolf) and of the literary tendencies of the period. Prerequisite: permission of the instructor.

382. Seminar in Contemporary Literature (I or II; R; 3, 0)
A selective study of the most recent developments in English and American prose or poetry. Prerequisite: permission of the instructor.

391. Seminar in Poetry (I or II; R; 3, 0)
A study of poetry as a genre and an analysis of the work of selected poets. Prerequisite: permission of the instructor.

392. Seminar in the Novel (I or II; R; 3, 0)
Special topics. Student reports, oral and written. Prerequisite: permission of the instructor.

393. Seminar in Contemporary Drama (AI or II; R; 3, 0)
Special topics. Student reports, oral and written. Prerequisite: permission of the instructor.

397. Seminar in Special Topics (I or II; R; 3, 0)
Topics such as comparative literature, literature and the arts, queer theory, or satire. Prerequisite: permission of the instructor.

398. Seminar in Literary/Critical Theory (I or II; R; 3, 0)
The study of Continental and American critical positions or schools from Modernism through Post-Structuralism. Prerequisite: permission of the instructor.

450. Capstone in Renaissance Literature (I or II; 3, 0)
Special topics. Interdisciplinary study of the Renaissance.

460. Law and Literature (I or II; 3, 0)
Studies in the relationship between law, narrative and social and fictional forms in the 18th century and modern Britain and America as these raise questions about identity, justice, historical powers, God, and the nature of civil obligations.

470. Capstone in 19th-century Studies (I or II; 3, 0)
Special topics. Interdisciplinary study of 19th-century Britain.

499. Seminar in Cultural Studies (I or II; 3, 0)
Introduction to significant issues and debates characterizing the field known as Cultural Studies. Prerequisite: permission of the instructor.

Creative Writing

Advanced courses in creative writing are conducted as workshops; therefore enrollment in these courses is restricted. ENGL 303, ENGL 308 and ENGL 309 may be repeated for credit. Individual projects in writing (e.g., a novel or a collection of verse) may be taken under the rubric of ENGL 319.

201. Creative Writing: Topics in Form and Theory (I and II; 3, 0)
Studies in such special topics as prosody, stylistics, characterization, or narrative theory. Courses emphasize formal or structural elements within particular genres and an appreciation of craft from a writer's perspective.

202. Introduction to Creative Writing: Fiction (I or II; 3, 0)
Principles of writing fiction, with constant practice. Designed for students planning to concentrate or minor in creative writing. Preference to first-year, sophomore, and junior students. Prerequisite: seniors by permission of the instructor.

203. Introduction to Creative Writing: Nonfiction (I or II; 3, 0)
Theory and practice of creative nonfiction, including travel writing, memoir, and other forms. Designed for students planning to concentrate or minor in creative writing. Preference to first-year, sophomore, and junior students. Prerequisite: seniors by permission of the instructor.

204. Introduction to Creative Writing: Poetry (I or II; 3, 0)
Principles of writing poetry, with constant practice. Designed for students planning to concentrate or minor in creative writing. Preference to first-year, sophomore, and junior students. Prerequisite: seniors by permission of the instructor.

303. Seminar in Writing Creative Nonfiction (I or II; R; 3, 0)
Advanced workshop in the writing of creative nonfiction. Prerequisites: ENGL 202 or ENGL 203 and permission of the instructor.

304. Poet-In-Residence's Poetry Workshop (I or II; R; 3, 0)
Taught by a distinguished visiting poet, this workshop in writing poetry is open to students who have taken at least one introductory creative writing course. May be repeated if taught by a different visiting poet. Prerequisite: ENGL 106 or ENGL 201.

308. Seminar in Writing Poetry (I or II; R; 3, 0)
Advanced workshop in writing poetry. Prerequisites: ENGL 204 and permission of the instructor.

309. Seminar in Writing Fiction (I or II; R; 3, 0)
Advanced workshop in writing of fiction. Prerequisites: ENGL 202 or ENGL 203 and permission of the instructor.

Courses in Film Studies

231. Pre- and Early Cinema (I or II; 3; 0)
Traces cinema's technological ancestors and examines film's profoundly different possibilities and alternatives prior to 1918. Weekly screenings illustrate cinema's various functions in its earliest years.

232. Film History I (I or II; 3, 0)
World cinema history from 1918 to 1945. Weekly screenings.

233. Film History II (I or II; 3, 0)
World cinema history from 1945 to present. Weekly screenings.

234. National Cinemas (I or II; R; 3, 0)
Concentration on the history and style of a particular national cinema. Weekly screenings.

235. Seminar in Gender and Film (I or II; 3, 0)
Current debates about gender and American film, from WW II to the present. Diverse critical approaches for interpreting film within the broad context of gender studies.

238. Special Topic in Film Studies (I or II; R; 3, 0)
Examination of a specialized topic in film studies. Weekly screenings.

332. Seminar in Film and Technology (I or II; 3, 0)
Traces technology's impact on film form and content. Topics include early cinema, sound technology, widescreen, and computer-generated images. Weekly screenings. Prerequisite: permission of the instructor.

336. Seminar in Film Genres and Auteurs (I or II; 3, 0)
Examination of a particular genre (film noir, Hong Kong action movies, Westerns, etc.), director, cinematographer, screenwriter, or producer. Weekly screenings. Prerequisite: permission of the instructor.

337. Seminar in Film Theory (I or II; 3, 0)
Survey of approaches to film analysis and critique, ranging from realist/formalist debates to psychoanalytic, feminist, and semiotics approaches. Weekly screenings. Prerequisite: permission of instructor.

339. Special Topic in Film Studies (I or II; 3, 0)
Examination of a specialized topic in film studies. Weekly screenings. Prerequisite: permission of the instructor.

Environmental Studies (ENST)

Program Director: Thomas Kinnaman

Coordinating Committee: Maria A. Antonaccio (environmental ethics), Diana Di Stefano (history), Craig Kochel (geology), Thomas C. Kinnaman (economics), Michael Malusis (civil and environmental engineering), Ben Marsh (physical geography), Molly McGuire (chemistry), Matthew McTammany (biology), Peter Wilshusen (sustainable resource management), Amanda Wooden (politics and policy)

Professor: Ben Marsh

Assistant Professors: Diana Di Stefano, Matthew McTammany, Peter Wilshusen, Amanda Wooden

Environmental studies is the interdisciplinary examination of how biology, geology, politics, policy studies, law, geography, religion, engineering, chemistry, and economics combine to inform the consideration of humanity's effects on the natural world. This

program educates the student to appreciate the complexity of environmental issues and solve them by working with citizens and experts in many fields. With a major in environmental studies, students have the electives to create a course concentration in an area of specialization while they simultaneously develop a breadth of interdisciplinary and methodological knowledge in the environmental fields that enables them to facilitate the definition and solution of environmental problems.

Specifically, the program has two major tracks: a bachelor of science and a bachelor of arts. Each requires the interdisciplinary study of environmental issues and an understanding of the complexity of the relationship between humanity and the environment, while they allow the student to concentrate his/her studies in a field of particular interest to that student. The bachelor of arts program is designed for those who want to develop core concentrations in the social sciences, policy and law, or the humanities, although a science concentration is also possible with this choice. The bachelor of science program is specifically designed for students who want a concentrated knowledge of environmental life science as the core of their interdisciplinary environment education.

Most environmental studies majors benefit from studying abroad. Field-based programs – such as School for Field Studies or School for International Training – are especially appropriate for environmental students.

Bachelor of Arts. An interdisciplinary bachelor of arts major in environmental studies is offered for the student with an abiding interest in the general environmental problems faced by humans, and with special concern for the social and policy aspects of their solution. Environmental studies is a strong, broad, liberal arts degree. It also is a preparation for one of the growing numbers of environmental careers in planning, business, non-profits, law, enforcement, or education.

The bachelor of arts in environmental studies major requires 10 courses distributed as follows:

- Life science core course: BIOL 208 Population and Community Biology
- One earth science core course (List 1)
- One social science core course (List 2)
- Three science and technical courses (List 3)
- Two social science and humanities courses (List 4), in addition to the social science core course
- ENST 200 Environmental Studies Research Methods or MATH 216 Statistics I
- One synthesizing senior course from: ENST 325 Senior Seminar, ENST 349 or ENST 350 Senior Thesis (preferably taken as one-half credit in each of junior and senior year) or a course from a senior seminar list, provided each semester.

Bachelor of Science. A bachelor of science in environmental studies with a concentration in life sciences is offered for the student interested in the living environment of human and natural systems. As a bachelor of science major, it is meant to provide substantial depth in ecology, the life sciences, and related fields within the context of a liberal education. This major provides students with a rigorous background in environmental biology, focusing on topics such as biodiversity, conservation biology, aquatic biology, and behavioral ecology.

The bachelor of science major in environmental studies comprises 17 courses distributed as follows:

- Two introductory biology courses, BIOL 207 Genetics and BIOL 208 Population and Community Biology to be taken during the first and sophomore years. BIOL 206 Organismal Biology may be substituted for BIOL 207 with adviser consent.
- Four advanced biology courses from: BIOL 313 Mammalogy, BIOL 321 Behavioral Ecology, BIOL 330 Plant Systematics, BIOL 334 Limnology, BIOL 341 Organic Evolution, BIOL 353 Ecosystem Ecology, BIOL 354 Topical Ecology, BIOL 356 Plant-Animal Interactions, BIOL 357 Ornithology, BIOL 358 Invertebrate Zoology, BIOL 370 Primate Behavior and Ecology, BIOL 415 Conservation Biology
- One earth science core course (List 1)
- One social science core course (List 2)
- Two science and technical courses (List 3) that are not biology courses
- Two social science and humanities courses (List 4), in addition to the social science core course
- Two courses in statistics, MATH 216 Statistics I and MATH 217 Statistics II to be taken first or sophomore years
- Any two of the following chemistry or geochemistry courses: CHEM 160 Introduction to Environmental Chemistry, CHEM 360 Advanced Environmental Chemistry, GEOL 205 Introduction to Geochemistry, GEOL 305 Aqueous and Environmental Geochemistry.
- Senior thesis: ENST 349 and ENST 350, preferably taken as one-half credit in each of junior and senior years.

Minor. The minor in environmental studies requires five courses distributed as follows:

- two courses from List 3 (Science and technical courses)
- two courses from List 4 (Social science and humanities courses); ENST 100 may count for one of these courses.
- BIOL 208, GEOG 110, GEOG 113, or GEOL 106.

Course lists

The bachelor of arts and bachelor of science environmental studies major programs are based on these lists of courses:

1. Earth science core: GEOL 106 Environmental Geology
2. Social science core: ECON 231 Resources and the Environment, ENST 100 Introduction to Environmental Studies (if taken before junior year), ENST 245 Environmental Policy and Politics
3. Science and technical courses: BIOL 321 Behavioral Ecology, BIOL 334 Limnology, BIOL 353 Ecosystem Ecology, BIOL 354 Tropical Ecology, BIOL 356 Plant-Animal Interactions, BIOL 357 Ornithology, BIOL 370 Primate Behavior and Ecology, BIOL 415 Conservation Biology, CHEM 160 Introduction to Environmental Chemistry, ENST 211 Environmental Pollution and Control, ENST 221 Hazardous Waste and Society, GEOG 231 Weather and Climate, GEOG 232 Evolution, Ecology, and Human Impact, GEOG 257 Global Environmental Change, GEOG 345 Food and Environment, GEOL 205 Introduction to

Geochemistry, GEOL 207 Environmental Geohazards, GEOL 210 Geomorphology, GEOL 301 Geophysics, GEOL 305 Aqueous and Environmental Geochemistry, GEOL 310 Applied Environmental Geomorphology, GEOL 324 Hydrogeology

4. Social science and humanities courses: ANTH 260 Anthropological Perspective on Human-Environment Relations, ECON 231 Resources and the Environment, ENST 205 Green Utopias, ENST 207 American Environmental History, ENST 215 Environmental Planning, ENST 225 Environmental Dispute Resolution, ENST 226 Water Politics and Policies, ENST 230 Introduction to Ecological Design, ENST 235 Land Use: History, Ethics, and Politics, ENST 240 Sustainable Resource Management, ENST 242 Environmental History of the Developing World, ENST 245 History of American Environmental Politics and Policy, ENST 247 Environmental History, ENST 250 Environmental Policy Analysis, ENST 255 Environmental Justice, ENST 260 Environmental Law, PHIL 218 Ecology, Nature and the Future, RELI 226 Environmental Ethics

100. Introduction to Environmental Studies (I; 3, 0)
A first course in environmental studies, exploring our major impacts upon the environment in their cultural, political, historical, economic, and ethical context.

200. Environmental Studies Research Methods (I; 3, 0)
Students will learn quantitative and qualitative research methods related to environmental studies including research design, data collection, and analysis.

205. Green Utopias (II; 3, 0)
Introduction to literary utopias and to the cultural writings of various ecological movements offering alternative concepts to the increasing destruction of nature.

207. American Environmental History (II; 3, 0)
Explores American environmental history by asking: "How did Americans interact with their landscape?" and "What were the consequences?" The course proceeds both chronologically and topically. Crosslisted as HIST 212.

211. Environmental Pollution and Control (I; 3, 3)
Introduction for non-engineering students to the major areas of environmental engineering. Topics include air, noise, and water pollution, solid, hazardous, and radioactive waste and methods to treat and dispose of these pollutants. Not open to students in the College of Engineering.

215. Environmental Planning (I; 3, 0)
Explores the main approaches to planning theory and their environmental applications. Considers how environmental planning can promote the socio-ecological health and sustainability of democratic communities.

221. Hazardous Waste and Society (II; 3, 3)
Hazardous waste regulation, risk assessment and toxicology, overview of treatment technologies and site investigation, environmental audits, facilities siting and public participation, pollution prevention. Not open to students in the College of Engineering.

226. Water Politics and Policies (I; 3, 0)
Examines the evolution and philosophical foundations of water use as well as the politics surrounding current issues in water use.

228. The Loire. A Cultural Heritage or a "Wild" River of the Anthropecene? (I or II; 3, 0)
This course includes in-class lectures and on-site discovery of the river aboard traditional boats. Goals of the course are: to develop a good understanding of the links between a-biotic and biotic dynamics and human activities, to understand the importance and the necessity of the river management, especially on rivers like the Loire (wild aspects, hydrology, etc.) Prerequisite: Open only to students enrolled in the Bucknell *en France* program.

229. Environmental Thinkers (I or II; 3, 0)
Course explores environmental thought and the debate over America's nature resources. Topics include: land use, environmental ethics, wise-use arguments, green politics, and current trends. May be crosslisted as HIST 229.

230. Introduction to Ecological Design (II; 3, 0)
The application of basic ecological principles to the design of buildings, landscapes, communities, and cities. Emphasis is placed on real situations in the local environment.

245. Environmental Policy and Politics (I or II; 3, 0)
An introduction to understanding the role of political institutions, stakeholders and policy processes (in the U.S. and internationally) in addressing environmental problems.

250. Environmental Policy Analysis (II; 3, 0)
Focuses on problem-oriented policy analysis of domestic and international issues including ecosystem management, endangered species, protected areas, and community-based conservation.

255. Environmental Justice (II; 3, 0)
Utilizing the literature of moral, social and political philosophy, we will analyze how variations in our definition of justice dictate distinct public policies toward nature.

260. Environmental Law (I; 3, 0)
This course will examine the statutes, regulations and common law pertaining to risk and pollution abatement. We will both analyze current law and propose changes to better address the environmental problems involved.

319. Directed Research (I and II; R) Half or full course.
Supervised research or thesis work on environmental issues. Prerequisite: permission of the instructor.

349 and 350. Senior Thesis (I and II; R) Half to full course.
Independent thesis work under adviser's supervision. Prerequisite: permission of the instructor.

371. Environmental History (I or II; 3, 0)
Intensive study of selected issues. Topics vary. Crosslisted as HIST 371.

Course offered occasionally: 240 Sustainable Resource Management, 242 Environmental History of the Developing World, 247 Environmental History of the Ancient World, 325 Seminar in Environmental Topics

Film Studies Minor

Coordinators: Eric S. Faden, Slava I. Yastremski

Film is one of the 20th and 21st centuries' major cultural forms and its study has become an important part of a modern humanities education. The interdepartmental minor in film studies helps students appreciate and understand the cinematic medium and its impact as a cultural and artistic force. This interdepartmental minor represents a rich and diverse program that explores the 20th and 21st centuries' most popular art form in the larger context of humanistic studies. The minor rigorously engages moving-image culture, teaching students to think historically, theoretically, and analytically about a wide range of cinematic forms. Simultaneously, the film studies minor encourages students to examine moving images from the vantage point of other disciplines.

The interdepartmental minor in film studies is an innovative, interdisciplinary program. It merges a broad range of courses that include the study of national cinemas, film in history, cinema's relation to both visual arts and literature, women and film, experimental film, popular film, and writing in, about, and through film. The program acquaints students with a variety of perspectives in film studies, sharpens their analytical skills, and enhances a critical appreciation of film culture in historical and social contexts. This interdepartmental minor in film studies ideally complements any major concentration in the humanities or the social sciences.

The interdepartmental minor in film studies requires at least five courses selected from the list below:

- At least one of two required core courses: ENGL 130 Writing About Film or UNIV 255 Film Experience: Introduction to Cinema Art. These courses provide a solid foundation for future studies of film. They acquaint students with cinema's development in the late 19th century to contemporary Hollywood and discuss major film genres and forms. The courses also discuss the relationships between film and literature and film and art.
- Three courses selected from the following: ENGL 231 Pre-and Early Cinema, ENGL 232 Film History, ENGL 233 Film History II, ENGL 234 National Cinemas, or ENGL 238 Special Topics in Film Studies; other courses on European, Russian, and Asian cinemas that expose students to other national film cultures such as: ANTH/EAST 247 Japanese Film as Anthropology, FREN 255 Introduction to French Cinema, RUSS 225 Russian Cinema: From the Revolution to Repentance, and UNIV 259 Entertaining the Nazis: Film. Also, courses on the relationship between film and literature, art, religion, and/or politics such as ART 340 Multimedia and Installation Art, ENGL 235 Gender and Film, ENGL 258 Shakespeare and Film, ECON 280 Political Economy of Media and Advertising, or RELI 234 Hinduism and Film.
- One course selected from the following courses taught at Bucknell: ENGL 332 Film and Technology, ENGL 336 Film Genres and Auteurs, ENGL 337 Film Theory, ENGL 339 Special Topic in Film Studies, or CAPS 494 Literature and Film: Theory of Screen Adaptation.

Students can propose to include another relevant course by consulting with and obtaining approval from the coordintor of this minor. Students interested in pursuing a film studies major can do so through the interdepartmental major and should consult with the film studies coordinator for more information.

Foreign Language Programs

Professors: Katherine M. Faull (Chair), Susan L. Fischer, Angèle Kingué, Peter Morris-Keitel (Director, German studies program)

Associate Professors: Philippe Dubois, Elaine Hopkins, Renee K. Gosson, James E. Lavine (Coordinator, linguistics program), Madhu Malik, Helen G. Morris-Keitel, Slava I. Yastremski (Director, Russian studies program)

Assistant Professors: Ghayda Ali (visiting), Nathalie Dupont, Gundolf Graml (visiting), Bernhard Kuhn (Coordinator, Italian studies program), Ludmila S. Lavine, Stéphanie Perrais (visiting), Allison Stedman, John E. Westbrook (Director, French and Francophone studies program)

The department offers courses in five modern languages, in American sign language, and in linguistics. Language courses are regularly offered in Arabic, French, German, Italian, and Russian, and on occasion, other Slavic languages.

Coursework in all the programs is designed to promote a level of language proficiency and cultural understanding that will enable students to be active participants in a shrinking multicultural world. Each program's curriculum features a sequence of courses focusing on the development of language skills, at the lower level, followed by a transition to upper-level courses that focus on the appreciation and critical analysis of a wide variety of literary and cultural works. As the Goals 2000 document of the National Standards in Foreign Language Education states: "Knowing another language system, another culture, and communication strategies, enables students to access new information and knowledge, develop insight into their own language and culture, and participate in multilingual communities and a global society."

Students are strongly encouraged to continue or begin the study of the language(s)/culture(s) of their choice as early in their undergraduate career as possible. Doing so will ensure the possibility of completing a major or minor in the language and will open the door to many stimulating study abroad programs. Many students find that the study of other languages and cultures provides a good background for work in other disciplines. In addition, by working to an advanced level of language proficiency and cultural awareness, students may improve their chances for a Fulbright or other international fellowships after graduation.

Placement: French and German: First-year students with prior instruction or background in French and/or German should take the on-line placement examination before arriving at Bucknell regardless of whether they have taken the AP exam or the SAT II. Information on accessing this exam is included in the first-year student registration materials. Any questions regarding placement should be directed to the program directors.

Italian and Russian: First-year students with prior instruction or background in Italian or Russian should contact the program coordinator (Italian) or the program director (Russian) to consult about the appropriate placement level.

World Literature (in English): ; EAST 211 Premodern Japanese Literature in Translation; EAST 212 Modern Japanese Literature in Translation; EAST 213 Traditional Chinese Literature in Translation; RUSS 211 Chekhov: Drama in Prose; RUSS 250 19th-century

Russian Literature in Translation; RUSS 255 Twentieth-century Literature in Translation; RUSS 325 Dostoevsky and Tolstoy: Literary Philosophy; SPAN 250 Hispanic Literature in Translation. For descriptions, see the respective programs of the department of foreign language programs and of East Asian studies.

Arabic (ARBC)

101. Beginning Arabic (I or II; 3, 0)
Beginning language skills. Practice in listening, speaking, reading and writing. Elementary grammar. Introduction to Arabic culture.

102. Beginning Arabic II (I or II; 3, 1)
Continuation of Arabic language skills. Practice in listening, speaking, reading, and writing. Prerequisite: ARBC 101 or equivalent.

103. Intermediate Arabic I (II; 3, 1)
A continuation and review of basic grammar, emphasizing all four language skills and culture. Prerequisite: ARBC 102 or equivalent.

104. Intermediate Arabic II (II; 3, 0)
Review of basic grammar with an emphasis on all four language skills and culture. Prerequisite: ARBC 103 or equivalent.

150. Women in Islam and Middle East (I or II; 3, 0)
This course introduces the female figures in the Quran, examines the present status and roles of women in Islam and the Middle East.

301. Advanced Topics in Arabic (I or II; R) Half to full course.
Advanced Arabic independent study under the direction and supervision of an instructor. Topics to be selected by the student in consultation with the instructor. Prerequisite: permission of the instructor.

Department of Foreign Language Program courses (DFLP)

210. Inventing Modern Europe (I; 3, 0)
Important events in history, politics, economics, the arts and sciences which have contributed to the formation of Modern Europe and the process of integration and unification.

French and Francophone Studies Program (FREN)

French and Francophone studies start with the acquisition of the linguistic and cultural skills needed to communicate in spoken and written French. As the students' skills advance, French courses increasingly emphasize humanistic study of the literatures and civilizations of France and other French-speaking countries around the world. French and Francophone studies, especially when they include study abroad, offer direct access to the perspectives and attitudes of a closely related, yet distinctly different culture. This knowledge and experience help students to gain greater awareness of themselves and their own culture and to acquire the cross-cultural skills so valuable in our diverse and shrinking world.

French is the most widespread international language after English, and proficiency in French is a valuable asset for students seeking a career in a wide variety of fields including advertising, business, banking, publishing, teaching in a secondary school, translating,

interpreting, foreign service, and tourism. The major also prepares students to go on to graduate school in literature, linguistics, civilization, or foreign language pedagogy. In addition, French is a useful, at times essential, language in disciplines such as art history, music, or philosophy.

The French major is best seen as a progression of linguistic-cultural study organized in four stages. One hundred-level courses focus on language proficiency in cultural context. Two hundred-level courses consolidate language skills while beginning a more systematic study of French literatures and civilizations. A year or semester in France provides direct experience in the French culture. Three hundred-level courses focus on specific topics in literature, civilization, and cultural studies.

The **major** in French consists of a minimum of eight courses at the FREN 104 level or above, excluding FREN 201, 202, 301, and 302. These must include FREN 150, FREN 230, FREN 231, FREN 270 or 271, and three courses at the 300 level.

Residence abroad is the best way to gain proficiency in the language and knowledge of the culture. Bucknell's own study abroad program, Bucknell *en France*, located in Tours, can accommodate students at all proficiency levels. Internships can be arranged for advanced students.

All majors who meet the requirements set by the Honors Council and wish to earn honors in French are encouraged to do so. Students interested in writing an Honors Thesis should contact a French faculty member early in the second semester of their junior year to discuss the process and to define a topic.

Students wishing to teach French at the secondary level should consult with the French program and the department of education as soon as possible in order to discuss the sequence of courses needed for certification.

The **minor** in French consists of five courses *taught in French* at the FREN 103 level and beyond, excluding FREN 201, 202, 262, 301, and 302.

101. Discovering French (Elementary level I) (I; 4, 0)
Beginning language skills. Practice in listening, speaking, reading, and writing; elementary grammar; and introduction to French civilization.

102. Exploring French (Elementary level II) (I and II; 4, 0)
Continuation of language skills. Practice in listening, speaking, reading, and writing; grammar; readings in literature and civilization. Prerequisite: FREN 101 or one year of secondary school French.

103. Building Proficiency in French (Intermediate level I) (I and II; 4, 0)
A review of basic grammar emphasizing all four language skills and culture. Prerequisite: FREN 102 or equivalent (three years of secondary school French).

104. Communicating in Context (Intermediate level II) (I and II; 4, 0)
Continuing review of basic grammar emphasizing all four language skills and culture. Prerequisite: FREN 103 or four years of secondary school French.

150. L'Ecriture Fantastique (I and II; 3, 0)
Application of major linguistic functions and acquisition of skills essential for 200-level courses through a series of contextualized writing assignments. Prerequisite: FREN 104 or five years of secondary school French.

201 and 202. Intermediate French Conversation I and II (I and II; 2, 0) Half courses.
Not open to students who have studied in France or other French-speaking countries. Concentration on development of speaking skill. Conducted entirely in French by native speaker. Intended for students enrolled in 200-level courses. Prerequisite: FREN 104 or equivalent. (Cannot be applied toward the French major or minor.)

230. French Literature I (I; 3, 0)
Introduction to French literature from the Middle Ages to the French Revolution. Provides an introduction to literary history and to methods of critical reading. A comprehensive survey. Prerequisite: FREN 150.

231. French Literature II (II; 3, 0)
Introduction to history of French literature of the 19th and 20th centuries and to methods of critical reading. In French. Prerequisite: FREN 150.

235. The French Speaking World (I or II; 3, 0)
Culture and literature of different areas of the French-speaking world. Prerequisite: FREN 150.

236. Topics in Francophone Literature and Culture (I or II; R; 3, 0)
Study of the literature, language, geography, history, music, and film of a particular Francophone region (French Caribbean, Quebec, West Africa, Maghreb, etc.) for the entire semester. Prerequisite: FREN 150.

255. Introduction to French Cinema (I or II; 3, 0)
Introduction to French cinema from a cultural and historical perspective. Students will familiarize themselves with major cinematic movements and with methods of critical reading. The course also includes discussions of the relationships between film, literature, and other visual arts. Prerequisite: FREN 150.

270. La France actuelle (I or II; 3, 0)
Introduction to contemporary France from historical, sociological, anthropological, and symbolic perspectives. The study of French attitudes, lifestyles, conceptions of society, social and political structures, and of France and French in a post-colonial context. Prerequisite: FREN 150.

271. La France artistique (I or II; 3, 0)
Introduction to French music, literature, and fine arts from the Middle Ages to the present. Focus on selected artists, writers, and musicians from each period. Provides a comprehensive survey. Prerequisite: FREN 150.

275. French Economy and Business Culture (II; 3, 2)
In-depth study of the language, culture, politics, and economic climate of business in France. Preparation for further study of management and internships in France.

295. Topics in French Studies (I or II; 3, 0)
Topics vary but permit study of one or several subjects in French literature, culture, and civilization. Prerequisite: FREN 150 and permission of the instructor.

301 and 302. Advanced French Conversation I and II (I and II; 2, 0) Half course.
Advanced conversation for students who have studied in France or other French-speaking countries. Conducted entirely in French by native speaker. May not be taken by native speakers of French. (Cannot be applied toward the French major or minor.)

322. Medieval and Renaissance Studies (I or II; 3, 0)
Examination of the literature of the medieval and Renaissance periods emphasizing the analysis of themes, ideas, and styles as well as cultural and historical contexts. Prerequisite: FREN 230 or permission of the instructor.

324. Seventeenth-century Studies (I or II; R; 3, 0)
Topics deal with aspects of Louis XIV's classical aesthetic. Examination and analysis of its literary, artistic, and cultural manifestations, its socio-political and philosophical underpinnings, and its counter-culture: the salon tradition. Prerequisite: FREN 230 or permission of the instructor.

325. Eighteenth-century Studies (I or II; R; 3, 0)
Topics vary, but deal with aspects of the literary, artistic, and intellectual manifestations of the decline of the *Ancien Regime* and the liberation of thought initiated by the pre-Revolutionary *philosophes.* Prerequisite: FREN 230 or permission of the instructor.

326. Nineteenth-century Studies (I or II; R; 3, 0)
Topics vary from year to year, but will inevitably focus on the interaction of Romantic imagination and Realist observation that characterizes the 19th century in France. Prerequisite: FREN 231 or permission of the instructor.

327. Twentieth-century Studies (I or II; R; 3, 0)
Topics will vary from year to year. The course could focus on a period, a genre, a group of major writers, or a theme. Emphasis is on discussion and writing. Prerequisite: FREN 231 or permission of the instructor.

330. Topics in Literature (I or II; R; 3, 0)
Advanced study of themes or topics in French and/or Francophone literature. Prerequisites: FREN 230, FREN 231, or permission of the instructor.

335. Literature and Culture of Quebec (AI or II; 3, 0)
Study of the literature, film, politics, and society of Quebec. Prerequisite: FREN 230, FREN 231, FREN 235, FREN 236, FREN 270, or FREN 271.

336. Francophone Africa (AI or AII; 3, 0)
Study of literature, film, politics, and society of Francophone Africa. Prerequisite: FREN 230, FREN 231, FREN 235, FREN 236, FREN 270, or FREN 271.

370. Topics in Civilization (I or II; R; 3, 0)
Advanced study in themes, topics, or periods in French history or civilization. Prerequisite: FREN 270 or permission of the instructor.

371. Topics in the Arts (I or II; R; 3, 0)
Advanced study in themes, topics, or periods of French art history. Prerequisite: FREN 271 or permission of the instructor.

390. Independent Study (I and II; R) Half to full course.
Subject to be selected by student in consultation with the instructor. Prerequisite: permission of the instructor.

395. Seminar in French Studies (I and II; R; 3, 0)
Topics vary but permit detailed study of any one of innumerable subjects in French literature and civilization. Prerequisite: permission of the instructor.

Courses offered at the Bucknell *en France* program in Tours

215. Advanced Intermediate French I (I or II) Half to full course
Intensive French language study during the student's first month in Tours. Offered only in Tours, required of all students their first semester there. Prerequisite: FREN 150.

216. Advanced Intermediate French II (I and II) Half to full course
Guided practice for the improvement of written and spoken French at the advanced intermediate level, and preparation for the DELF French proficiency exam. Offered only in Tours, required of all students their first semester there. Prerequisite: FREN 215.

217. Advanced French I (II)
Intensive French language study during first month of second semester in Tours. Offered only in Tours. Prerequisite: FREN 215.

218. Advanced French II (II; 3, 0) Half to full course
Guided practice for the improvement of written and spoken French at the advanced intermediate level, and preparation for DELF French Exam. Offered only in Tours. Prerequisite: FREN 216.

219. Le Français juridique (I or II; 3, 0)
Introduction to the vocabulary and concepts of French law. Offered only in Tours. Prerequisite: FREN 150.

261. Traduction (I or II; 3, 0)
Introduction to translation. Offered only in Tours. Prerequisite: FREN 150.

276. Tours Artistique (I and II; 2, 0) Half course.
The many faces of Tours as reflected in the arts. Offered only in Tours.

277. LaFrance au Quotidien (II; 1, 1) Half course.
Introduction to the history and literary scene of the Touraine region. Offered only in Tours. Prerequisites: For second semester Bucknell *en France* students staying for a full year in Tours and who have taken FREN 275.

290. Independent Study (I or II; 3, 0)
Independent study in French for students enrolled in the Bucknell *en France* program. Prerequisites: permission of the instructor and enrollment in the Bucknell *en France* program.

Course offered occasionally: 262 Intercultural Communication

German Studies Program (GRMN)

German studies provides an integrated and interdisciplinary approach to the study of German language, the analysis of artifacts of German culture – literature, art, music, film, etc. – and the use of German for special purposes, for example, in a business setting.

Coursework in the discipline combines the achievement of greater language proficiency in the areas of reading, writing, speaking, and listening with a basic knowledge of German culture and methods of critical interpretation. There have been major thinkers in almost every field from physics to philosophy, economics, or psychology who were German-speakers, and today, Germany contributes significantly to political, cultural, and economic developments in Europe. German studies also furthers critical thinking skills while fostering cross-cultural understanding.

The German studies program has as its goal that all majors achieve an intermediate-high to advanced-low proficiency in the areas of linguistic and cultural knowledge. This means that German majors can communicate not only about daily needs but that they also can understand and articulate positions on social, literary, or cultural topics with a reasonable amount of linguistic accuracy. This is to say that as students progress through the major they learn various theoretical approaches to the interpretation of cultural artifacts and must, therefore, keep working on their German language skills in order to acquire the vocabulary and syntax necessary to express more complicated ideas and concepts. In general, students' "passive" skills, reading and listening, are further developed than their active skills, speaking and writing, when finishing the major. Additional aspects inherent to this goal include increasing students' understanding of the way in which cultural artifacts, literature, film, theater, music, art, advertising, etc., are embedded in a historical context which determines gender, class, and race relations within the target culture(s). Simultaneously, comparisons and contrasts are made in regard to the learners' own cultural background(s) in order to foster cross-cultural understanding.

A major in German may provide the basis for graduate work within the field. Moreover, German is considered a useful second language in many disciplines in the humanities, such as philosophy or art history. In combination with other majors, such as economics, international relations or management, a German major can prepare one for a career in international business or law or in the foreign service.

The **major** in German consists of the equivalent of seven full-credit courses at the GRMN 204 level and above. Four of these courses must meet specific requirements: Conversation and Composition (GRMN 204 or its equivalent), one course dealing with German cultural issues (GRMN 270, GRMN 272, GRMN 273 or its equivalent), a course focusing on German literary studies (GRMN 230 or its equivalent), and at least two courses at Bucknell at the 300 or Capstone level, only one of which may be independent study. GRMN 201-202 (Strategies in Speaking German) and GRMN 310 (German for Reading Knowledge) are not applicable to the major in German.

German majors are strongly urged to participate in a study abroad program approved by Bucknell's German studies program. The benefits of such a total immersion experience in attaining linguistic and cultural proficiency cannot be overemphasized. Many abroad programs also offer internship experiences. Students interested in study abroad should consult the faculty of the German studies program at the earliest possible date.

All majors who meet the requirements set by the Honors Council and wish to earn honors in German are encouraged to do so. Students interested in writing an Honors Thesis should contact a German faculty member early in the second semester of their junior year to discuss the process and to define a topic.

German majors and minors should supplement their study of German with work in other languages, European history, art history, music, philosophy, or work in European political science and economics.

Students planning to teach German at the secondary level should consult with the German studies program and Bucknell's department of education as soon as possible.

The **minor** in German consists of the equivalent of five full-credit courses at the GRMN 101 level or above. There are no other specific course requirements for the minor. Students interested in minoring in German should consult a German studies program faculty member for the appropriate sequencing of courses. GRMN 201-202 (Strategies in Speaking German) and GRMN 310 (German for Reading Knowledge) do count towards the minor. German minors also are strongly encouraged to participate in an approved study abroad program.

The College of Engineering has approved a German minor that consists of the equivalent of five full-credit courses at the GRMN 103 level or above. A required course for this minor is GRMN 225 German for Engineers and Natural Scientists. Students interested in this minor should consult Professor Helen Morris-Keitel for the appropriate sequencing of courses. GRMN 201-202 (Strategies in Speaking German) and GRMN 310 (German for Reading Knowledge) do count toward the minor.

101. Exploring Your World – elementary level I (I; 4, 0)
Beginning language skills. Practice in listening, speaking, reading, and writing; elementary grammar, and introduction to German culture.

102. Everyday Life in Germany – elementary level II (II; 4, 0)
Continuation of language skills. Practice in listening, speaking, reading, and writing; grammar; reading in culture and literature. Prerequisite: GRMN 101 or equivalent.

101A. Intensive Elementary German (II; 4, 2) One and a half course.
Intensive practice in speaking, listening, reading, and writing German. Introduction to everyday German culture. Successful completion meets the prerequisite for GRMN 103.

103. Building Proficiency in German – intermediate level I (I; 4, 0)
A continuation and review of basic grammar, emphasizing all four language skills and culture. Prerequisite: GRMN 102 or equivalent.

104. Communicating in Context – intermediate level II (II; 4, 0)
Review of basic grammar, emphasizing all four language skills and culture. Prerequisite: GRMN 103 or equivalent.

127 and 128. Intermediate German, Part A and Part B (I and II; 2, 0) Half course.
Together these courses will provide students with the skills covered in the one-semester course GRMN 103. Prerequisite: GRMN 102 or equivalent.

201 and 202. Strategies in Speaking German (I and II; 2, 0) Half course.
Concentration on development of speaking skills. Conducted in German by native speaker. Intended for students enrolled in 200- and 300-level courses. Prerequisite: GRMN 103 or equivalent.

204. German Conversation and Composition (I; 3, 0)
Intensive practice in speaking and writing German. Prerequisites: GRMN 103, GRMN 127 and GRMN 128, GRMN 104 or equivalent.

220. The German Economic System (II; 3, 0)
Introduction to the concepts and vocabulary of the German economic system. Prerequisite: GRMN 204 or equivalent.

221. Doing Business in Germany (I; 3, 0)
Development of skills necessary to function in the German business world. Prerequisite: GRMN 204 or equivalent.

225. German for Engineers and Natural Scientists (I or II; 3, 0)
Introduction to concepts and vocabulary pertinent to these disciplines as well as discussion of the "culture" of engineering and science in German-speaking countries. Prerequisite: GRMN 204 or equivalent.

230. Introduction to German Literature (II; 3, 0)
Examination of the major literary genres with an emphasis on developing a critical approach to the reading of texts. Prerequisite: GRMN 204 or equivalent.

231. Reading German Literature (AI; R; 3, 0)
Intended to sharpen the critical skills developed in GRMN 230 and provide students with more in-depth knowledge of a particular genre. Prerequisite: GRMN 204.

240. Reflections of Science and Technology in German Culture (I or II; 3, 0)
An overview of German cultural responses to technological and scientific progress from the early 1800's to the present. Prerequisite: GRMN 204 or equivalent.

261. Nazi Culture (I; 3, 0)
A study of Nazi attitudes towards the arts, science, education, mass media, work, morality, sex, war, and religion. In English. Crosslisted as UNIV 261.

270. The Bourgeois Era: 19th-century Germany (AI; 3, 0)
An overview of German society from Romanticism to World War I from a cultural-historical perspective. In English.

272. Modern German Culture (I; 3, 0)
An overview of cultural, social, economic, and political issues in the German-speaking world since 1945. In German. Prerequisite: GRMN 204 or equivalent.

273. Beyond the Wall: GDR Culture (I; 3, 0)
Exploration of the cultural world of the "other" Germany beyond the Berlin Wall. Literature, film, music. In German. Prerequisite: GRMN 204 or equivalent.

295. Topics in German Studies (II; R; 3, 0)
Study of topics in German culture or literature at an intermediate level. Prerequisite: GRMN 204 or equivalent.

296. Advanced German Composition (II; R; 3, 0)
Concentration on the writing of analytic German. Advanced level. Prerequisite: GRMN 204 or equivalent.

310. German for Reading Knowledge (I or II; 3, 0)
Students will learn grammatical structures and vocabulary necessary to read German language texts in their disciplines. In English. Prerequisite: permission of the instructor.

322. Leitmotifs in 19th-century German Culture (I or II; 3, 0)
Examination of how German-speaking writers, artists, and composers use a specific form and/or address a specific issue at various points throughout the 19th century. Prerequisite: GRMN 230 or equivalent.

325. Enlightenment and Early Romantic Literature 1750-1815 (I or II; 3, 0)
Analysis and interpretation of major literary and intellectual works. In German. Prerequisite: GRMN 230 or equivalent.

328. The Cold War in Germany (I; 3, 0)
Analysis of Cold War politics and literature in East and West Germany, 1945 to 1990 and beyond. In German. Prerequisite: GRMN 230 or equivalent.

329. Weimar Republic to the Present-day Literature 1918 – Present (I or II; 3, 0)
Analysis and interpretation of major literary and intellectual works. In German. Prerequisite: GRMN 230 or equivalent.

390. Independent Projects in German Studies (I and II; R)
Directed reading for selected seniors and juniors. May serve as honors course. Prerequisite: permission of the instructor.

392. Advanced Seminar in Selected Literary Topics (I or II; R; 3, 0)
The course will deal with selected topics in German literature on an advanced level. In German. Prerequisite: GRMN 230 or equivalent.

393. Advanced Seminar in Selected Cultural Topics (AI and AII; R; 3, 0)
The course will deal with selected topics in German culture on an advanced level. In German. Prerequisite: GRMN 270 or GRMN 272 or GRMN 273 or equivalent.

Hebrew (HEBR)

101. Beginning Modern Hebrew (I; 3, 1)
Introduction to modern Hebrew. Practice in speaking reading and writing; elementary grammar and introduction to Israeli culture.

Italian Studies Program (ITAL)

Italian Studies Minor
Coordinator: Bernhard Kuhn

The Italian studies minor includes the acquisition of the linguistic and cultural skills necessary to communicate on a basic level as well as content courses in Italian or English

on various aspects of Italian culture including, but not limited to, art, music, literature, film, history, political science, and economics. The minor is intended to offer students access to a culture vital to the development of the fine arts in the Western world and to add a new dimension to discussions about a rapidly changing Europe.

Residence abroad is the best way to gain proficiency in the language and knowledge of the culture. A semester abroad in Italy is strongly recommended and a variety of opportunities are available to students through the Office of International Education. Students wishing to study in Italy are encouraged to contact the coordinator of the Italian studies minor as early as possible in order to discuss the various options.

The **minor** in Italian study consists of a minimum of five course credits. Elementary Italian language courses, ITAL 101 and ITAL 102 (or their equivalent), are required for the minor. The remaining three credits can be fulfilled according to the following options:

1. Those students spending a semester in Italy can count two of the courses taken there towards their minor (or three, if they spend a year), after consultation with and approval of the coordinator of the Italian studies minor.
2. Students also may choose courses from a list of courses taught at Bucknell whose content focuses on Italian language, culture, or history. Only one course in Latin or classics may count toward the minor.
   - Italian courses offered by the department of foreign language programs when staffing allows: ITAL 103 Intermediate Italian I, ITAL 104 Intermediate Italian II, ITAL 201-202 Intermediate Italian Conversation (half course), ITAL 205 Discovering Italy, ITAL 250 Introduction to Italian Cinema, ITAL 295 Topics in Italian Studies, ITAL 390 Independent Study (half to full course).
   - Courses offered by other programs/departments: ART 271 Italian Renaissance Art, ART 319/320 Special Studies in Art (when the topic is Italian art), ART 370 Kress Paintings Seminar, CLAS 132 Roman Civilization, CLAS 236 Age of Augustus, CLAS 243 Archaeology of Rome, HUMN 310 Dante and Milton, LATN 101 Introduction to Latin I, LATN 102 Introductory Latin II, MUSC 222 Baroque Music, MUSC 267 Topics in Music History (Puccini).
3. Students also may choose courses in which half the content is Italian, such as a course on Italian and Flemish Baroque art, or one on Verdi and Wagner. In such a case, a half-credit toward the minor would be granted (i.e., two such courses would equal one Italian credit). In this case, any choices that students make as to field of personal research (such as for a term paper) will of course focus on the Italian part of the course. No more than one credit towards the Italian studies minor can be accumulated in this manner.
   - Such courses would include: ART 102 World Art II: Renaissance to Enlightenment, ART 319/320 Special Studies in Art (when half of the content is Italian), IREL 218 International Relations of Europe (with permission of instructor and of the director of the Italian studies program), MUSC 229 Opera and Ideas, POLS 223 European Politics (with permission of the instructor and the director of the Italian studies program).

For further information regarding the minor, contact Bernhard Kuhn, coordinator.

101. Elementary Italian I (I and II; 4, 0)
Beginning language skills, practice hearing, speaking, reading, and writing; elementary grammar; and introduction to Italian culture.

102. Elementary Italian II (I or II; 4, 0)
Continuation of language skills. Practice in hearing, speaking, reading, and writing. Introduction to Italian culture. Prerequisite: ITAL 101 or equivalent.

103. Intermediate Italian I (I; 4, 0)
Review and expansion of language skills and cultural knowledge of Italy. Prerequisite: ITAL 102 or equivalent.

104. Intermediate Italian II: Italian Civilization (II; 4, 0)
Continuing review of grammar emphasizing all four skills. Focus on civilization. Prerequisite: ITAL 103 or equivalent.

201. Intermediate Italian Conversation I (I or II; 2, 0) Half course.
Concentration on development of speaking skills. Conducted in Italian by native speakers. Prerequisite: ITAL 103 or equivalent.

202. Intermediate Italian Conversation II (I or II; 2, 0) Half course.
Concentration on development of speaking skills. Conducted in Italian by native speakers. Prerequisite or corequisite: ITAL 104 or equivalent.

205. Discovering Italy (I; R: 3, 0)
Introduction to Italian culture. Intensive practice in speaking and writing Italian. Prerequisite: ITAL 104 or equivalent.

250. Introduction to Italian Cinema (II; 3, 0)
Survey of Italian cinema from the silent era to the present. Discussion of major Italian cinematic movements and genres within the context of history, politics, and culture. Prerequisite or corequisite: ITAL 104.

295. Topics in Italian Studies (II; 3, 0)
Study of topics in Italian culture, literature, and/or civilization. Prerequisite: ITAL 101 or equivalent.

390. Independent Study (I or II; R) Half to full course.
Subject to be selected by student in consultation with the instructor. Prerequisite: permission of the instructor.

Linguistics Program (LING)

Coordinator: James E. Lavine

While there is no major in linguistics, a minor is available. The linguistics **minor** consists of five courses, four of which must be taken in linguistics. The fifth course can be satisfied by taking an additional course in linguistics or by taking one of the following courses offered by other departments: PSYC 204 Human Cognition, CSCI 208 Programming Language Design, ENGL 295 The History of the English Language, or HUMN 340 Introduction to Translation Studies.

Additionally, interdepartmental majors including linguistics and related disciplines are encouraged.

105. Linguistic Analysis: Sounds and Words (I or II; 3, 0)
One semester of a two-semester introduction to linguistics. Topics include: phonetics, phonology, word forms, language change, language acquisition. No prerequisite.

110. Linguistic Analysis: Sentences and Dialects (I or II; 3, 0)
One semester of a two-semester introduction to linguistics. Topics include: syntax, semantics, language variation, language and society.

210. Language and Race (AI or II; 3, 0)
An introduction to "non-standard" dialects of English with a primary focus on African American Vernacular English (AAVE or Ebonics). This course explores the linguistic and non-linguistic factors that give rise to language variation.

215. Syntax (AI; 3, 0)
Contemporary generative theory of phrase structure and its relation to meaning. Focus on comparative syntax and its implications for Universal Grammar. Prerequisite: LING 110 or permission of the instructor.

216. Semantics (AI or II; 3, 0)
An introduction to the fundamental notions, arguments, and techniques of linguistic semantics. Focus on how meaning is structured and represented by the human mind. Prerequisite: LING 110 or permission of the instructor.

220. Historical Linguistics (AII; 3, 0)
An introduction to the study of language change and genetic linguistic relationships. Change in the building blocks of language (sounds, morphemes, words, sentence structure) is analyzed with the goal of extrapolating regular patterns. Prerequisite: LING 105 or permission of the instructor.

225. Language and the Brain (AI or II; 3, 0)
An examination of the physical basis for language. Topics include the nature of language as a cognitive faculty, language evolution, language acquisition, atypical language development in childhood, and acquired aphasia. Prerequisite: LING 105 or LING 110.

241. Teaching Foreign Language (II, 3, 0)
The objectives, materials, and methods of teaching foreign language skills. Prerequisites: LING 105 and a course in the structure of one foreign language.

295. Topics in Linguistics (I and II; R; 3, 0)
A specific linguistic topic, to be selected. Prerequisite: LING 105 or LING 110 or permission of the instructor. May be repeated for credit.

390. Independent Study (I and II; R)
Subject to be selected by the student in consultation with the instructor. Prerequisite: permission of the instructor.

Russian Studies Program (RUSS)

Studying Russian, the fifth most widely spoken language in the world, becomes especially important at the present time when Russia is becoming an essential partner in global politics, economy, and issues of the environment. By developing students' language skills and expanding their knowledge about Russian culture and society, the Russian studies program strives to make students active participants in the multicultural, global community. Since Russian is one of the less-frequently taught languages, a major in Russian can become a unique and decisive factor in students' future careers in law, business, journalism, international affairs, and public and government services. The faculty of the Russian studies program believes that even with a mastery of Russian grammar, real communication is still impossible unless students become familiar with Russian culture and society and the life experiences of Russians. For that reason the Russian studies program offers courses in literature, culture, folklore, and Russian society.

The **major** in Russian studies consists of eight courses: five languages courses beyond RUSS 103 and three courses on Russian literature/culture taught in English.

The Russian program offers four levels of Russian language study, striving to bring students to the intermediate high/advanced low level according to the ACTFL scale. This means that after graduation students are able to function effectively in Russian.

Students majoring in Russian are strongly urged to deepen their knowledge of the language and country by studying in an approved summer or semester program in Russia. Students also may accelerate their language learning through intensive summer language study at other American universities.

The program offers two different **minors**: a minor in Russian language requires five Russian language courses; and a minor in Russian area studies requires five courses in the program, two of which may be Russian language courses. For both minors at least one of the five courses, taught in either Russian or English, must have a strong literature/culture component. Courses which fulfill this requirement are: RUSS 125, RUSS 211, RUSS 222, RUSS 225, RUSS 250, RUSS 252, RUSS 253, RUSS 255, RUSS 301, RUSS 302, RUSS 311, RUSS 312, RUSS 325, RUSS 340.

101 and 102. Elementary Russian I and II (I and II; 5)
Intensive training in speaking, reading, writing, and comprehending Russian. Fundamentals of grammar and popular culture. Prerequisite: RUSS 101 or equivalent is prerequisite for RUSS 102.

101A. Intensive Elementary Russian (I or II; 3, 2)
Intensive training in speaking, reading, writing, and comprehending Russian. Fundamentals of grammar and popular culture.

103 and 104. Intermediate Russian I and II (I and II; 3, 1)
Advanced points of grammar and review of grammar. Training in all language skills combined with the study of cultural texts. Prerequisite: RUSS 102 or equivalent for RUSS 103; RUSS 103 is the prerequisite for RUSS 104.

106. Elementary Conversation and Composition (II; 2, 0) Half course.
Development of oral skills in Russian. Intended for students enrolled in RUSS 101. Students may take only one half credit course per semester.

125. Topics in Russian Culture (I; R; 3, 0)
An examination of everyday life in Russia as a mirror of historical, ideological, sociological, and economic forces. In English.

201. Advanced Russian I (I; 3, 0)
Advanced notions of Russian grammar; review of intermediate grammar. Advanced reading, composition, and conversation. In Russian. Prerequisite: RUSS 104 or equivalent.

204. Russian Conversation (I and II; R, 2) Half course.
Concentrated development of speaking skill. Conducted entirely in Russian by a native speaker. Intended for students enrolled in 200- and 300-level courses. This course cannot be taken more than twice.

205. Russian for Business (AII; 3, 0)
Designed for proficiency in business communication skills. Studies the grammar and lexicology of commercial offers, orders, contracts, complaints, shipping, and delivery. In Russian.

209. Russian Complementary Reading (I or II; R; 1, 0) Half course.
Russian sources read in conjunction with English language courses. Independent course of study established by instructor and student. Prerequisite: the equivalent of four semesters of Russian. This course cannot be taken more than twice.

211. Chekhov: Drama in Prose (AI; 3, 0)
Detailed analysis of Chekhov's poetics of theater through close reading and discussion of his major plays. Application of his theater poetics to his prose writings for their adaptation for stage. In English.

222. Russian Through Theater (I or II; 3, 0)
Advanced study of Russian language, particularly phonetics and intonation patterns through reading, discussion, and performing plays. In Russian.

225. Russian Cinema (I; 3, 0)
Traces through viewing and detailed analysis of films the development of Russian cinematography; from the innovations of directors like Eisenstein, Pudovkin, to the poetic-metaphorical aesthetics of Tarkovsky, Abuladze. In English.

250. Nineteenth-century Russian Literature in Translation (AI; 3, 0)
Survey of 19th-century Russian literature. Existential modes of thought in Pushkin, Gogol, Lermontov, Tolstoy, Dostoevsky, Chekhov, and their influence on Western European culture. In English.

252. Russian Through Literature (I or II; 3, 0)
A study of Russian through literary works by contemporary Russian writers. In Russian.

253. Folklore and Ritual (I or II; 3, 0)
Survey of major approaches to folklore; sociological and psychological functions of folklore. Life cycle rituals and agrarian cycles. Slavic examples. In English. Crosslisted as ANTH 253.

255. Twentieth-century Russian Literature in Translation (II; 3, 0)
Survey of 20th-century Russian literature. Major trends in Russian literature of the Revolutionary and post-Revolutionary period. Examines the problems of political dissent. In English.

280. Topics in the Slavic Languages (I and II; R) Half to full course.
Study of a Slavic language other than Russian. Languages may include Ukrainian, Polish, Czech, and Serbo-Croatian. Prerequisite: permission of the instructor.

295. Topics in Russian Studies (AII; R; 3, 0)
Readings and discussion of special interest relevant to Russian studies. Topics selected by students in consultation with the instructor. In Russian.

301. Nineteenth-century Russian Culture and Civilization (IA; 3, 0)
Cultural and ideological developments from Kievan Russia to 19th-century Russia: art and artistic trends in the context of historical events and everyday life. Extensive use of slides and video materials. For advanced students of Russian. In Russian.

302. Twentieth-century Russian Culture and Civilization (IIA; 3, 0)
Cultural developments from Chekhov to the present – the arts of the Silver Age, Socialist, realism, and post-Stalinism in the context of socio-political changes in 20th-century Russia. Extensive use of slides and video materials. For advanced students. In Russian.

311. Readings in Russian Literature (I or II; 3, 0)
An advanced study of the Russian language through close reading and discussion of short works by major Russian writers. In Russian.

312. Russian Guitar Poetry (AII; 3, 0)
The rise of new genre during the post-Stalinist period as a social, political, and ethical commentary on the time, through the songs of Vysotsky, Okhudzava, Galich. In Russian.

325. Dostoevsky and Tolstoy: Literary Philosophy (II; 3, 0)
The course is intended to introduce students to major philosophical ideas of F. Dostoevsky and L. Tolstoy who have been considered not only the greatest Russian writers but also the most profound thinkers. In English.

340. Russian Through Film and Theater (I or II; 3, 0)
An advanced study of Russian through watching and analyzing films and taped theatrical productions. In Russian.

350. Advanced Topics in Russian (I or II; R, 3, 0)
Readings and discussion of special topics at an advanced level. Topics selected by instructor in consultation with students. Prerequisite: successful completion of 200-level course or equivalent.

390. Independent Study (I or II; R; 3, 0)
Advanced independent research under the supervision of an instructor. Subject to be selected by student in consultation with the instructor. Prerequisite: permission of the instructor.

393. Honors in Russian (I or II; R; 3, 0)

American Sign Language (SIGN)

101 and 102. Elementary American Sign Language I and II (I and II; 2, 0) Half course. An introduction to American Sign Language. Training and practice in signing together with approaches to communicating with deaf people. SIGN 101 or equivalent is prerequisite for 102.

Foundation Seminar (FOUN)

Each first-year student in the College of Arts and Sciences enrolls in a small seminar of about 15 students, usually in the fall semester. Foundation Seminars are offered by many different faculty and focus on a wide variety of subjects. Whatever the topics, they are designed to cultivate the attitudes, skills, and knowledge necessary for students to benefit maximally from a Bucknell University education and to negotiate the complexities of the modern world. The seminars stress the following: active, independent learning; collaborative learning; development of students' capacity for analysis, reflection, judgment, and creativity; multiple perspectives; and development of skills students need in order to engage in intellectual endeavors at Bucknell and beyond. These courses address foundation skills in reading, writing, listening, and speaking and also develop students' ability to use the library effectively and to use computers (e.g. word processing, simulations, use of a database, or analysis of data).

French

See Foreign Language Programs

Geography (GEOG)

Professors: Ben Marsh, Karen M. Morin

Associate Professors: Duane A. Griffin, Paul H. Susman (Chair)

Assistant Professor: Adrian N. Mulligan

Geography studies the ways people shape and give meaning to their environments and are shaped by them. Human geography (a social science) is concerned especially with the political, economic, social, and cultural processes and resource practices that give definition to particular places, and that, in turn, are affected by them. Physical geography (a natural science) focuses on the earth systems that create the human environment, such as weather, soils, biogeography, and earth-sculpting processes. Specialties in geography complement and integrate material from cognate fields such as political science, economics, sociology, women's and gender studies, geology, and biology.

The course of study in geography is designed to provide a strong background in the discipline and a substantial foundation for a liberal arts education. A major in geography is good preparation for those interested in graduate work in geography, environmental and resource fields, urban planning and policy, or in careers in law, journalism, government, international affairs, business, and public service.

The **major** in geography consists of a minimum of nine courses which must include:

- two of the following three required human geography courses (social science credit): GEOG 209, GEOG 211, GEOG 220;

- any two from the physical geography courses (natural science credit);
- four other geography courses (includes CAPS 411 courses);
- a geography methods course, usually satisfied by GEOG 204, but a substitute is possible with department approval (e.g., statistics or language study).

Some courses in other departments are accepted toward the major: GEOL 106 Environmental Geology (counts for the physical geography requirement), and others with geography department approval.

The geography **minor** consists of five geography courses, at least one of which is a geography science course, and no more than one of which may be at the 100 level.

100. From Earth to Home (II; 3, 0)
Explore how why and where humans transform planet Earth, creating the distinct places, landscapes, and territories we call home.

101. Geographies of Globalization (I; 3, 0)
An introduction to the processes and dynamics leading to the ever-changing character of places and regions, and an examination of interdependence amidst processes of globalization.

110. World Environmental Systems (I; 3, 3)
Survey of physical geography, organized upon an understanding of how natural systems – climate, landscape evolution, biological community – create the different environments of the world. Laboratory science course.

113. Human Impact on the Environment (II; 3, 0)
Causes and effects of major environmental changes induced by humans, and the tools scientists use to interpret environmental change. Non-laboratory science course for BA students.

166. Reading the Cultural Landscape (I; 3, 0)
Understanding the human landscape as a cultural, historic, ecological, and symbolic system, through our observations of the geography around us. Prerequisite: juniors and seniors by permission only.

175. Landforms of the World (AI; 3, 3.5)
Understanding the pattern of landforms around the world, the processes that created them, and their influence on humans. Laboratory science course for B.A. students. Prerequisite: juniors and seniors by permission only.

204. Applied G.I.S. (I or II; 3, 0)
Introduction to the use of Geographical Information Systems to collect, structure, and display large or complex spatial data sets, using examples from human and physical geography.

209. Economic Geography (II; 3, 0)
Inquiry into local and global changes in economic activity, location, and spatial organization, especially focusing on implications for the well-being of people in particular places.

210. Urban Condition (I; 3, 0)
Geographic and sociological inquiry into pressing urban issues of advanced industrialized societies, including inequality, housing, employment, and how cities fit into the American present and future. Crosslisted as SOCI 210.

211. Political Geography (I; 3, 0)
Illustrates the complex relationship between power, knowledge, and geography at a range of different scales, from the local to the global. Also examines the role played by geographers in the service of empires, states and nations, and questions whether contemporary developments challenge the existence of the nation-state.

214. Europe in the Age of Globalization (II; 3, 0)
Examines the geographical mosaic that is "Europe" in the contemporary period marked by conflicting forces of globalization, nationalism, and regionalism.

220. Cultural Geography (I; 3, 0)
Role of culture in shaping places. How cultures are geographically expressed, and how geography is a basic element in the constitution of cultures.

223. Gender and Geography (II; 3, 0)
In most societies women and men inhabit quite different physical and social spaces or inhabit the same space in different ways. This course explores links between gender relations and spatial structures.

226. Western Places, American Myths (II; 3, 0)
Surveys recent literature pertaining to contact and conflict among culture groups, American nationalisms, and ecological history as they relate to the history and geography of the American West.

229. Introduction to American Studies (I; 3, 0)
This course introduces the interdisciplinary field of American studies, emphasizing key texts and methods for understanding American culture, values, peoples, and issues. Crosslisted as UNIV 229.

231. Weather and Climate (II; 3, 3)
The controls of weather: insolation, evaporation, wind, and topography; the climates that result; and their impact on human activity.

232. Evolution, Ecology, and Human Impact (I; 3, 3.5)
This introductory course explores processes shaping the distribution and diversity of life on earth as a framework for understanding our impact on the biosphere. Laboratory science course.

235. Marine Environment (II; 3, 0)
Future of the oceans: global change and sea level rise, pollution and human impact, coastal management, threatened ecology of the ocean, sustainability and marine resources.

236. Third World Development (II; 3, 0)
Socio-cultural, economic, and environmental problems confronting developing countries. Includes such topics as political-economic change in a global and local context, transnational corporations, gender relations, food production/consumption, urbanization, and sustainable development.

257. Global Environmental Change (I or II; 3, 0)
Understanding human and physical systems as they respond to the natural and human-induced changes in the global environment. Prerequisite: permission of the instructor.

265. Geography of Pennsylvania (II; 3, 0)
Exploring the landscape, industry, culture, and history of Pennsylvania; using this example to understand the broad themes of human geography.

301. Topics in Advanced Physical Geography (I or II; 3, 4)
Specialized topics in physical geography.

309. Topics in Advanced Economic Geography (I or II; R; 3, 0)
Specialized topics in economic geography.

310. Topics in Advanced Social Geography (I or II; 3, 0)
Specialized topics in social geography. Prerequisite: permission of the instructor.

311. Topics in Advanced Political Geography (I; R; 3, 0)
Specialized topics in political geography. Prerequisite: permission of the instructor.

319 and 320. Undergraduate Research (I and II; R) Half or full course.
Supervised research, readings, and/or preparation of a paper on some aspect of geography. Prerequisite: permission of the instructor.

321 and 322. Special Topics in Geography (I and II; R; 3, 0)
Development and growth of geographic thought; investigation, report and/or seminar on currently significant topics in geography. Prerequisite: permission of the instructor.

345. Food and the Environment (I; 3, 3.5)
Nothing from the environment is more important than food production, nothing affects the environment more; we'll study both environmental and social circumstances. Laboratory science course.

Geology (GEOL)

Professor: R. Craig Kochel

Associate Professors: Christopher G. Daniel (Chair), Mary Beth Gray, Carl S. Kirby, Jeffrey M. Trop

Assistant Professors: Chad Ferguson (visiting), Ellen K. Herman

Geology is the natural science that involves the nature and history of the earth, including scientific analysis of environmental problems. The Bucknell geology curriculum engages students with concepts and issues related to the earth and its environments, through coursework, field studies, and scientific research. A geology degree equips students with analytical skills, problem solving skills, communication skills, experience in teamwork, and solid grounding in field-based science. Geology includes diverse subdisciplines ranging from geologic hazards and geochemistry to hydrogeology and geological engineering. At an introductory level, geology coursework provides students with basic knowledge of the earth and its systems and how that knowledge can provide an understanding of potential solutions to environmental problems. Knowledge of the earth, its processes, hazards,

history, resources, and limitations can be an important component of a liberal education and also can provide a foundation for advanced work in the discipline.

An undergraduate degree provides the foundation needed for employment or graduate degree specialization. In addition to gaining acceptance to some of the most prestigious graduate programs in the country, recent graduates have secured employment in environmental or engineering consulting firms, governmental agencies, and educational institutions. Students also have used our courses toward certification as teachers in earth and space sciences.

At Bucknell University, students can major in either environmental geology or geology, and each of these is available in both bachelor of arts and bachelor of science degree programs. These four tracks are united in having a common core of six geology courses (GEOL 103, GEOL 104, GEOL 201, GEOL 210, GEOL 214, GEOL 217). A bachelor of science track is appropriate for students who have decided to begin a career in geoscience or pursue a graduate degree in a geologic/environmental profession. Students who elect a bachelor of arts track hold greater curricular flexibility, allowing for a second major or minor. Recent bachelor of arts graduates have attended graduate school or secured employment in geoscience, environmental science, environmental law or policy, education, business, medicine, and science writing.

Geology

The **bachelor of arts major** in geology consists of the six core courses (GEOL 103*, GEOL 104, GEOL 201, GEOL 210, GEOL 214, GEOL 217), plus two additional courses at the 200 level or above, with the exception of GEOL 319, GEOL 320, GEOL 329, and GEOL 430; laboratory science courses in other departments may be substituted for any of these two courses with the approval of the department. Students are encouraged to take a summer field course in geology, to elect additional courses in science and mathematics, and to participate in independent study research opportunities through GEOL 319-320 or GEOL 329-430, with the latter experience preferred.

The **bachelor of science major** in geology requires 12 courses (one for half-course credit): 1) the six core courses (GEOL 103*, GEOL 104, GEOL 201, GEOL 210, GEOL 214, GEOL 217), 2) GEOL 312, GEOL 329, and GEOL 430, and 3) three courses selected from GEOL 205, GEOL 213, GEOL 301, GEOL 305, GEOL 310, GEOL 321 or GEOL 322, and GEOL 324. Additional requirements include MATH 201-202, MATH 211 or MATH 216; PHYS 211; CHEM 201-202 or CHEM 211-212 or CHEM 221 with approval of the advisers. A summer course in field geology is strongly recommended.

The recommended sequence for the bachelor of science major is as follows. (The sequence may be altered in consultation with the adviser.)

First Year	**First Semester:** GEOL 103*; MATH 201 **Second Semester:** GEOL 104; MATH 202
Sophomore Year	**First Semester:** CHEM 221; GEOL 210; GEOL 217 **Second Semester:** GEOL 312; MATH 211 or MATH 216
Junior Year	**First Semester:** GEOL 201; PHYS 211; Elective in geology^ **Second Semester:** GEOL 214; GEOL 329**

Senior Year	**First Semester:** GEOL 430; Elective in geology^ **Second Semester:** Elective in geology^

*GEOL 103 ordinarily required for the major. Other 100-level geology courses may be approved by consultation with the department.

**Denotes half-credit course.

^Three courses chosen from GEOL 205, GEOL 213, GEOL 301, GEOL 305, GEOL 321/322 (only one), GEOL 324.

Environmental Geology

The **bachelor of arts major** in environmental geology consists of eight courses: 1) the six core courses (GEOL 103*, GEOL 104, GEOL 201, GEOL 210, GEOL 214, GEOL 217), 2) GEOL 205, and 3) one course selected from GEOL 301, GEOL 305, GEOL 310, and GEOL 324. Students are encouraged to take a summer field geology course, a course in statistics, and to participate in independent study research opportunities through GEOL 319-320 or GEOL 329-430, with the latter experience preferred. Electives are recommended in science and mathematics, as well as from other departments offering environmental sciences and engineering courses.

The **bachelor of science major** in environmental geology requires 12 courses (one for half-course credit): 1) the six core courses (GEOL 103*, GEOL 104, GEOL 201, GEOL 210, GEOL 214, GEOL 217), 2) GEOL 205, GEOL 324, GEOL 329, GEOL 430, 3) one course selected from GEOL 301, GEOL 305, and GEOL 310, and 4) one course selected from GEOL 213, GEOL 312, GEOL 321, or GEOL 322. Additional requirements for the major include: MATH 201-202; PHYS 211; and two courses from an approved list of courses from either biology, chemistry, or civil engineering. The list of approved courses that can be used to meet this last requirement include: 1) two courses selected in biology from BIOL 208, BIOL 334, BIOL 344, BIOL 356, BIOL 358, and BIOL 415; or 2) CHEM 201-202; CHEM 211-212; or CHEM 221 with approval of the adviser; or 3) two courses in engineering selected from CENG 320, CENG 340, CENG 350, CENG 421, CENG 425, CENG 444, CENG 451, and ENGR 220, ENGR 222. Additional courses from biology, chemistry, or civil engineering may be substituted with the approval of the department. A summer course in field geology is strongly recommended. Additional courses in statistics and advanced mathematics are recommended for students planning graduate and advanced professional work.

The recommended sequence for the bachelor of science major in environmental geology is as follows. (The sequence may be altered in consultation with adviser.)

First Year	**First Semester:** GEOL 103*; MATH 201 **Second Semester:** GEOL 104; MATH 202
Sophomore Year	**First Semester:** GEOL 201; GEOL 210 **Second Semester:** GEOL 205; GEOL 214
Junior Year	**First Semester:** GEOL 217; PHYS 211@; Science/engineering elective ^ **Second Semester:** GEOL 329**; GEOL 324; Science/engineering elective^

Senior Year	**First Semester:** GEOL 430; Elective in geology (one from GEOL 213, GEOL 312, GEOL 321, GEOL 322) **Second Semester:** Elective in geology (one from GEOL 301, GEOL 305, GEOL 310)

*GEOL 103 ordinarily required for the major. Other 100-level courses may be approved by consultation with the department.

**Denotes half-credit course.

^Two courses in the same department selected from 1) BIOL 208, BIOL 334, BIOL 356, BIOL 358, BIOL 415; 2) CENG 320, CENG 340, CENG 350, CENG 421, CENG 425, CENG 444, CENG 451, ENGR 220, ENGR 222 or 3) CHEM 211-212.

@If a student's schedule permits, the department recommends that this course be taken in an earlier year.

Students may choose from three **minors** in the area of geology:

- The minor in geology requires GEOL 103 or GEOL 106 and GEOL 104; and any two 200- or 300-level geology courses except GEOL 230, GEOL 319, GEOL 320, GEOL 329, and GEOL 430.
- The engineering geology minor requires four courses: GEOL 150 and GEOL 201; and any two 200- or 300- level geology courses except GEOL 213, GEOL 230, GEOL 312, GEOL 319, GEOL 320, GEOL 329, and GEOL 430.
- The environmental geology minor requires four courses: one from GEOL 103, GEOL 106, or GEOL 150; and any three from GEOL 205, GEOL 210, GEOL 301, GEOL 310, and GEOL 324.

Independent supervised research experiences are strongly encouraged by the department. Many of these are associated with the Senior Program (GEOL 329,GEOL 430), but other opportunities are available through Undergraduate Research (GEOL 319, GEOL 320).

The department encourages majors who are completing independent research experiences and who meet requirements to become candidates for Honors.

The department attempts to make it possible for students to enroll in study abroad programs. At times this involves changing sequences of recommended courses. Consultation with major adviser is essential.

103. The Dynamic Earth (I and II; 3, 4)
General introduction to the earth's external and internal dynamic systems, the processes that operate within plate tectonics to make Earth a unique planet, and human interaction with the earth. Not open to students who have taken GEOL 106 or GEOL 150.

104. Evolution of the Earth (I and II; 3, 4)
An introduction to the evolution of life, climate, plate tectonics, and catastrophes through time provides perspective for making decisions about ongoing human impacts on the environment. Demonstrated by a field-based study of the Appalachian Mountains. Prerequisite: first- or second-year status, others by permission.

106. Environmental Geology (I and II; 3, 4)
Geologic factors and limitations that affect use or management of the environment. Not open to students who have taken GEOL 103 or GEOL 150.

107. Global Change – Past and Present (I or II; 3, 0)
Introduction to major transformations of the physical, biological, and chemical components of Earth systems from a geological perspective – including climate, tectonics, biodiversity, sea-level, and ocean circulation.

150. Engineering Geology (II; 3, 4)
Basic principles, including properties of rocks and soils, hydrology, surface processes, rock mechanics, environmental parameters, geological hazards, and engineering case histories. Not open to students who have taken GEOL 103 or GEOL 106.

201. Structural Geology (I; 3, 4)
Orientation and geometric analyses of rock structures, kinematics and mechanics of rock deformation at all scales. Prerequisite: GEOL 103, GEOL 106, GEOL 150, or permission of the instructor.

205. Introduction to Geochemistry (I; 3, 4)
Element distribution, basic thermodynamics and kinetics, mineral and gas solubility, phase diagrams, stable and radioactive isotopes, oxidation-reduction processes, surface geochemistry, composition of natural waters. Prerequisites: MATH 201; CHEM 201- 202; or permission of the instructor.

207. Environmental Geohazards (I or II; 3, 0)
Geologic environmental hazards. Emphasis on hazards recognition and assessment in seminars, and field applications. Topics include: soils, slopes, floods, fans, earthquakes, land use, coastal and groundwater hazards. Open to geology majors by permission of the instructor.

210. Geomorphology (II; 3, 4)
Physical processes shaping the earth's surface and evolution of resulting landforms. Emphasis on linkages between landscape components and understanding complex relationships between process and form. Prerequisite: one 100-level course in geology.

213. Paleontology (AI; 3, 4)
Principles of evolution and ecology applied to investigation of ancient life. Emphasis on characteristics of marine invertebrate fossils. Prerequisite: GEOL 104 or permission of the instructor.

214. Physical Sedimentology and Stratigraphy (II; 3, 4)
Principles and techniques of the study of depositional processes and environments. Introduction to physical, chemical, and biological influences on sedimentation. Emphasis on semester-long, field-based project in the Appalachian basin. Prerequisite: GEOL 104.

217. Crystallography-Mineralogy (I; 3, 3)
Principles of crystallography and mineralogy; crystal morphology, structure, chemistry, physical properties, genesis, occurrence, and identification of important minerals by various techniques including x-ray diffraction. Prerequisite: GEOL 103, GEOL 106, GEOL 150, or permission of the instructor.

230. Environmental GIS (AI or II; 3, 4)
Geographic Information Systems (GIS) in geologic mapping, environmental monitoring, and hydrologic modeling. Introduction to global positioning (GPS), environmental databases, spatial analyses, and terrain modeling.

301. Geophysics (AI or II; 3, 3)
Broad-based introduction to the principles of applied and solid earth geophysics. Environmental applications of geophysics will be examined. Prerequisite: permission of the instructor.

305. Aqueous and Environmental Geochemistry (AII; 3, 4)
Thermodynamics and kinetics as applied to environmental geochemical problems such as aqueous complexation, weathering, clay minerals, sorption phenomena. Analytical and statistical approaches to geochemical data collection and reduction. Prerequisite: GEOL 205 or permission of the instructor.

310. Applied Environmental Geomorphology (AII; 3, 4)
Surviving on a complex and dynamic earth surface. Understanding environmental problems and geologic hazards with geologic principles set in a multidisciplinary framework. Prerequisites: GEOL 210 and permission of the instructor.

312. Igneous and Metamorphic Petrology (II; 3, 3)
The classification, mineralogy, petrography, geochemistry, structure, and genesis of igneous and metamorphic rocks. The interpretation of tectonic settings from igneous and metamorphic rocks. Prerequisite: GEOL 217.

319 and 320. Undergraduate Research (I or II; R) Half or full course.
Research course for qualified students in any branch of geology. Prerequisite: permission of the instructor.

321 and 322. Special Topics in Geology (I or II; R; 3, 0)
Investigation, report, or discussion on currently significant topics in geology. Prerequisite: permission of the instructor.

324. Hydrogeology (I or II; 3, 4)
Fundamentals of subsurface flow, regional groundwater flow, well hydraulics, and groundwater quality. Prerequisites: GEOL 103, GEOL 106, GEOL 150, or permission of the instructor.

329. Senior Program I (II; 1, 4) Half course.
Planning, bibliographic compilation, instruction in techniques, and initial work on senior thesis. Prerequisite: permission of the instructor.

430. Senior Program II (I; 0, 8)
Independent research, stressing field and laboratory investigation of geologic problems, and culminating in a senior thesis. Prerequisite: permission of the instructor.

German

See Foreign Language Programs

Greek

See Classics

History (HIST)

Professor: Martha H. Verbrugge

Associate Professors: James A. Goodale, Leslie C. Patrick (Chair), B. Ann Tlusty, Richard D. Waller

Assistant Professors: Julian E. Bourg, David W. Del Testa, Warren A. Dym (visiting), John P. Enyeart, Jeremy Kuzmarov (visiting)

Courses in history are designed to encourage reflection on the nature, advantages, and struggles of human societies in different times and places, and to invite cross-cultural comparisons. Moreover, they are intended to stimulate the historical imagination and to promote critical and technical skills in the comprehension and production of historical narratives.

Students of history may take many different roads to historical understanding; department members have diverse interests, and they actively encourage students' independent investigations of history. Majors, in particular, are invited to collaborate closely with their department mentors in their historical inquiries, while at the same time shaping their own methodologies, foci, questions, and answers. Students majoring in history are encouraged to plan their program of study with their departmental adviser by the end of the sophomore year.

The **major** consists of a minimum of eight courses selected as follows:

- Four courses from any one cluster (the primary cluster).
- Two courses chosen from another cluster (the secondary cluster).
- Two elective courses chosen from any cluster.

Regardless of which primary cluster they choose, students must not take more than six courses in any one geographical area (defined as Europe, America, or non-western). Clusters are, however, not necessarily geographically specific.

The eight-course minimum must include at least one seminar or designated topics course. No more than two 100-level courses may count toward the major.

When the subject matter and focus of topics and seminar courses varies from year to year, individual courses will be assigned to the appropriate clusters on a yearly basis (see course list). HIST 100 and HIST 200 normally count in any cluster.

Clusters: There are seven clusters. They group courses together by area of inquiry. Clusters 4 to 7 are not geographically specific.

1. American History (35 courses): This cluster includes all courses dealing with American history. Within it, students may follow a sequence of period courses from the colonial period to the modern era, or they may focus on particular aspects or interpretations. Courses: HIST 111, 112, 113, 121, 122, 211, 212, 214, 217, 218, 219, 220, 221, 222, 223, 225, 227, 228, 229, 262, 263, 265, 270, 271, 273, 279, 310, 311, 312, 313, 319, 321, 322, 323, 371.

2. European History (35 courses): This cluster includes all courses dealing with European history, including both broad surveys and more specialist courses on Britain, France, Germany, and Russia. Within it, students may opt for the sequence of surveys, focus on the history of one or more countries or pursue particular aspects and interpretations. Courses: HIST 131, 132, 170, 171, 231, 232, 233, 236, 237, 238, 239, 240, 241, 242, 245, 246, 247, 248, 250, 251, 252, 258, 262, 263, 265, 267, 268, 272, 273, 279, 290, 299, 330, 351, 361.
3. Non-western History (18 courses): This cluster groups courses in the history of other areas of the world, specifically Africa, South East Asia, China, and Japan, together with courses dealing with the impact of western imperialism. Courses: HIST 185, 260, 264, 269, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 299, 390, 399.
4. Intellectual History (27 courses): This cluster introduces students to the study of ideas and intellectual movements, both western and non-western. Courses: HIST 170, 214, 227, 228, 229, 237, 238, 246, 247, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 272, 273, 310, 311, 319, 331, 360, 361.
5. Political, Economic, and Labor History (39 courses): This cluster covers both Europe and America and includes courses dealing with law, diplomacy and warfare, as well as more familiar topics in economic and political history. Courses: HIST 111, 112, 113, 131, 185, 212, 214, 217, 218, 219, 220, 221, 222, 223, 225, 233, 236, 239, 242, 247, 248, 249, 250, 251, 252, 260, 287, 288, 289, 290, 296, 297, 310, 311, 313, 320, 321, 322, 323.
6. Social History (40 courses): This cluster groups courses dealing with race, class, and gender, as well as courses dealing more broadly with social history. Courses: HIST 111, 112, 113, 121, 122, 171, 211, 212, 214, 217, 218, 219, 220, 221, 222, 223, 225, 231, 238, 245, 247, 248, 250, 251, 252, 258, 271, 279, 291, 292, 299, 310, 311, 313, 319, 320, 321, 330, 351, 390.
7. History of Science and Medicine (9 courses): This cluster introduces students to the specific field of science and medicine within the broader range of history. It includes courses in both American and European history. Courses: HIST 170, 171, 270, 271, 272, 273, 279, 370, 371.

Students are encouraged, with the help of their advisers, to pick courses which reflect their particular interests within and between clusters. They may, if they wish and with the support of their adviser and another member of the department, construct their own primary cluster to reflect these interests.

History majors are encouraged to become proficient in languages appropriate to their studies, and to seek out courses in other departments that complement their historical interests.

A **minor** in history consists of a minimum of five courses, of which not more than two may be at the 100 level. At least one must be a seminar or designated topics course.

Introductory Courses

Introductory (100-level) history courses are intended for first- and second-year students. Third- and fourth-year students will be admitted to these courses only at the discretion of the instructor.

All 100-level history courses are designed to address a set of issues fundamental to historical understanding: the examination and evaluation of sources, the construction of historical accounts, and questions of point of view. While every 100-level course introduces students to some of the basic methods and practices of history, each course has its own particular topic, time span, and thematic emphasis.

General

100. Thinking about History ((I or II; 3, 0; R)
Topics vary. An introductory history course for the development of informed historical analysis among its students. Primarily for first-year students.

200. The Historians' Craft (I or II; 3, 0)
An intensive introduction to the discipline of history, its various approaches and methods as practiced by members of the department. The course includes a research component.

American History

111. Introduction to U.S. History I (I or II; 3, 0)
This course introduces students to American history from the pre-colonial period through the War of 1812.

112. Introduction to U.S. History II (I or II; 3, 0)
This course introduces students to American history from Jeffersonian America through the Spanish-American-Cuban-Filipino War.

113. Introduction to U.S. History III (I or II; 3, 0)
This course provides an introduction to 20th-century American history.

121. Introduction to African American History I (I; 3, 0)
A survey of African American history from colonial times to the Civil War.

122. Introduction to African American History II (II; 3, 0)
Continuation of HIST 121 above to the present.

European History

131. Pre-modern Europe (I or II; 3, 0)
A survey of Europe in the pre-industrial era. Content and goals vary with instructor.

132. Modern Europe (I or II; 3, 0)
Survey of modern Europe.

History of Science and Medicine

170. Introduction to the History of Science and Technology (I or II; 3, 0)
A general survey of Western science and technology in relation to social and intellectual developments from ancient times to the present.

171. Introduction to the History of Medicine and Public Health (I or II; 3, 0)
A cross-cultural survey of medicine and public health, emphasizing how different societies have interpreted and responded to epidemic diseases.

Non-western History

185. Introduction to Modern Southeast Asian History and Culture (I; 3, 0)
Examining all of Southeast Asia in general but focusing on Vietnam, Indonesia, and the Philippines. This course will examine the transition from colonialism to independence in Southeast Asia and the cultural and political expression of that transition. Not open to seniors.

Periods and Fields

American History

211. Frontiers and Borderlands (I or II; 3, 0)
This course examines the development of the American West to 1900.

212. American Environmental History (II; 3, 0)
Explores American environmental history by asking: "How did Americans interact with their landscape?" and "What were the consequences?" The course proceeds both chronologically and topically. Crosslisted as ENST 207.

214. Topics in American History (II; 3, 0)
Topics vary.

217. American Colonial History (I; 3, 0)
Examines effects of European settlement on the North American continent. This course considers social, legal, and economic consequences for the various groups during encounters that occurred between 1607 and 1770.

218. African Americans and the American Revolution (II; 3, 0)
Inquiry into the meaning of American independence from the perspective of the people for whom freedom was not intended.

219. Antebellum America (I; 3, 0)
An examination of social problems and movements during this era. Focus may vary. Slavery and slave narratives; underground railroads; utopian visions; abolitionists; strikes and labor protests; women's movement.

220. American Civil War and Reconstruction (II; 3, 0)
The period is studied in depth as a revolutionary era through attention to political, economic, social, constitutional/legal, intellectual trends, events, personae, movements and institutions.

221. U.S. History: 1880s to 1930s (II; 3, 0)
The rise and development of American capitalism, as well as the political and social movements that accompanied this period of economic turbulence will be covered.

222. U.S. History from the 1940s to the Present (I; 3, 0)
Continuation of HIST 221 above.

223. Twentieth-century African American History: Eyes on the Prize (S; 6,0)
Course uses as a primary source the documentary "Eyes on the Prize" to examine African American history between 1954 and 1985.

225. Topics in American Political and Economic History (I; R; 3, 0)

Intensive study of leading themes in American history since 1600. Topics vary from year to year, but may include economic and political structures, intellectual movements, or social and cultural history.

227. American Intellectual History I (I; 3, 0)
A study of selected thinkers, ideas, and intellectual currents from Puritanism through the Civil War.

228. American Intellectual History II (II; 3, 0)
A study of selected thinkers, ideas and intellectual currents from 1865 to the present.

229. Topics in American Intellectual History (I; 3, 0)
Studies in topics such as the Puritan origins of the American self, pragmatism and social reform, radical visions and American dreams.

European History
231. Social History of Early Modern Europe (II; 3, 0)
Social history survey of continental Europe from the Black Death through the period of religious wars (1348-1700).

236. Nineteenth-century Europe (I; 3, 0)
Romanticism, nationalism, and imperialism are examined, together with straight-forward political developments.

237. The Renaissance (I or II; 3, 0)
This course focuses upon the major religious, social, artistic, literary, and political constructs of the influential thinkers of the European Renaissance, 1300-1600.

238. Witchcraft and Magic in Europe (I or II; 3, 0)
This course examines magic and witchcraft beliefs in Europe during the age of witch-hunting (Renaissance to Enlightenment). Topics vary.

239. Contemporary Europe, 1890-1995 (II; 3, 0)
The crises of European cultures: world wars, economic depression, social unrest, and the decline of hegemony, the struggles for revitalization.

240. Greek History (II; 3, 0)
From the heroic Bronze Age down through the Persian invasion, the flourishing of Classical Athens, and the Peloponnesian wars to the death of Socrates, focusing on political, social, and economic developments. Crosslisted as CLAS 217.

242. Topics in French History (I; R; 3, 0)
Specific focus will vary but always a study of aspects of the constitution and transformation of major political-cultural formations which shape French society.

245. Topics in German History (I; 3, 0)
Topics vary. Intensive study of leading themes in German history since 1400.

246. Medieval Heresies and Heretics (I or II; 3, 0)
Course examines the major heresies in western Europe from 1100 to 1600, and the church's attempts at repression.

247. Topics in European History (I or II; R; 3, 0)
Intensive study of leading themes in European history since 1400. Topics will vary but may include economic and political structures, intellectual movements, or social and cultural history. Prerequisite: permission of the instructor.

248. Topics in Russian History (II; R; 3, 0)
Topics vary. An examination of various periods in the history of Russia and the Soviet Union that includes a balance of political, social, and cultural elements.

250. Medieval and Early Modern Russia (I or II; 3, 0)
This course provides a survey of the principal events and themes in Russian history from the ninth through the early 18th century.

251. Imperial Russia (I or II; 3, 0)
This course provides a survey of the principal events and themes in Russian history from the early 18th through the early 20th century.

252. Soviet Russia (I or II; 3, 0)
An overview of the political, intellectual, cultural, and social history of the Soviet Union from its ideological roots to its collapse as a communist power.

Women's and Gender History
258. Topics in Women's and Gender History (I or II; R; 3, 0)
Topics vary. Instructors shape the content according to their own interests in seeking insights into the historical constructs of gender in Europe and/or the United States.

Intellectual History
260. Race, Nation-state and International Relations (II; 3, 0)
The course examines the processes by which states as expressions of social relations that are embedded in political institutions have been used by social forces, nationally, and transnationally, to racialize nations, societies, and global politics. Crosslisted as IREL 245 and POLS 274.

261. Twentieth-century Afro-Caribbean and African American Thought (II; 3, 0)
Study of the intellectual contributions and scholarly vision of people of African descent to sociological theory, social philosophy, and social change in the 20th century. Crosslisted as SOCI 280.

262. History and Film (I or II; 3, 2)
An introductory exploration of various aspects of cinematic representations of historical periods, events and agents.

263. History and Film II (I or II; 3, 0)
An advanced exploration of various aspects of cinematic representations of historical periods, events and agents.

264. Intellectual Conflict in Modern China (II; 3, 0)
China's traumatic intellectual confrontation with the West. Scorn, fear, wonder, excitement, and terrible dissension. From the first 19th-century challenges to the tradition to the rejection of the Thought of Mao Zedong. Crosslisted as EAST 268.

265. Intellectual Politics and Culture (I or II; 3, 0)
Topics will vary. A history of the intellectual foundations and expressions of modern political life, including conservativism, liberalism, socialism, and anarchism.

266. Topics in Intellectual History (I or II; R; 3, 0)
Topics will vary. Intensive study of major themes and thinkers in intellectual history.

267. European Intellectual History I (I; 3, 0)
A survey of the main currents of European philosophical, social, and political thought from the 14th through the 18th centuries.

268. European Intellectual History II (II; 3, 0)
A study of selected thinkers, ideas, communities of discourse, and intellectual currents from the late Enlightenment to the present.

269. Social Darwinism East and West (AII; 3, 0)
Darwin's evolution revolution on the rampage, in the religious, philosophical, social, and political thought of England, the United States, and China. Crosslisted as EAST 277.

History of Science and Medicine

271. Medicine in the U.S. (I or II; 3, 0)
A survey of Americans' experiences and views of health and sickness, and the growth of professional medicine and public health, from Colonial times to the present.

272. History of Science I (I; 3, 0)
Natural science during the Scientific Revolution (ca. 1450-1700), including intellectual, philosophical, and social developments.

273. History of Science II (II; 3, 0)
Major developments in science and technology from the early 1800s to the present, and their social context and implications.

279. Topics in the History of Science and Medicine (I or II; R; 3, 0)
Topics vary: nonorthodox medicine; women and science; women and medicine; technology and social change. Prerequisite: permission of the instructor.

Non-western History

287. Perspectives: The Vietnam War (I or II; 3, 0)
A comprehensive examination of the conflicts in Vietnam from 1940 to 1981.

288. The History of Vietnam (I or II; 3, 0)
Intensive study of the history of Vietnam from the era of Chinese occupation in the second century BC to the present.

290. European Imperialism and Colonialism (II; 3, 0)
Considers the rise, development, and fall of Western political and economic hegemony over the peoples and states of Asia and Africa since the late 19th century.

291. African History I (I; 3, 0)
Survey of Sub-Saharan Africa during the 19th century. Emphasis on aspects of social and economic change.

292. African History II (II; 3, 0)
The construction and destruction of colonial states and the impact of colonial rule on sub-Saharan Africa.

293. China from Ancient Times to the 18th Century (I; 3, 0)
Chinese history and culture from their beginning to the middle of the Qing Dynasty, before that dynasty and China were challenged by the West. Crosslisted as EAST 233.

294. China Since 1800 (II; 3, 0)
China from the eve of its modern confrontation with the West to the present through years of traumatic challenge and change. Crosslisted as EAST 234.

296. Modern Japanese History (I; 3, 0)
Japanese economy, society, politics, war, and diplomacy from 1868 to World War II; successes, crises, and conflicts in building a modern nation-state. Crosslisted as EAST 255.

297. The People's Republic of China (II; 3, 0)
A historical look at life in China under the rule of the Communist Party. Unprecedented triumphs and tribulations. Crosslisted as EAST 267.

299. Topics in Non-western History (I or II; R; 3, 0)
Selected major issues in the study of imperialism and colonialism.

Seminars

Admission to a seminar course is by permission of the instructor only.

311. U.S. History since 1865 (I or II; R; 3, 0)
Topics vary.

312. American Social History (I; 3, 0)
Everyday life, the family, pre-industrial and industrial society, social organizations and social conflicts, material culture, poverty and punishment. Prerequisite: permission of the instructor.

313. The American West (I or II; R; 3, 0)
This course examines the U.S. West. Topics vary.

319. African American History (I or II; R; 3, 0)
Focuses on recent developments in the field. Topics vary but may include slavery; African American intellectual history; black feminism; race, class, and gender; social and political movements and cultural criticism. Prerequisite: permission of the instructor.

320. American Labor History (I or II; 3, 0)
This course explores the formation of the American working class. Issues such as political activism, economic transformations, gender roles, and shop-floor militancy will be covered. Not open to first-year students.

321. American Immigrants (I or II; 3, 0)
This course explores the history and consequences of American immigration. The cultural practices, work, political activism, and nativist challenges to various immigrant groups will be covered. Not open to first-year students.

322. American Industrialization and Political Development (I or II; 3, 0)
This course focuses on the development and relations between workers, political parties, laws, and social movements. Not open to first-year students.

323. U.S. Foreign Policy in the 19th Century (I or II; 3, 0)
This course examines American political and economic expansion from independence to the early 20th century. Crosslisted as IREL 323. Not open to first-year students.

330. European History (I or II; R; 3, 0)
Intensive study of selected issues. Topics vary.

351. Women's and Gender History (I or II; R; 3, 0)
Intensive study of selected issues. Topics vary.

360. Intellectual History (I or II; R; 3, 0)
Intensive study of selected issues. Topics vary. Prerequisite: permission of the instructor.

361. Modernism and Postmodernism (I or II; 3, 0)
A history of the origins and crises of modernity, modernism, and postmodernism. Prerequisite: permission of the instructor.

370. History of Science and Medicine (I or II, R; 3, 0)
Intensive study of selected issues. Topics vary. Prerequisite: permission of the instructor.

371. Environmental History (I or II; 3, 0)
Intensive study of selected issues. Topics vary. Crosslisted as ENST 371.

390. African History (II; R; 3, 0)
Intensive study of selected issues. Topics vary.

399. Non-western History (I or II; 3, 0)
Intensive study of selected issues. Topics vary. Not open to first-year students.

Independent Study and Honors Program

The department encourages students to develop independent study programs with faculty members. In addition, interested and qualified students, in consultation with the chair, are encouraged to apply to the Honors Council for admission to the university honors program. The application normally would be submitted at the beginning of the fall semester of the senior year. Students who do honors work in history submit a substantial honors thesis, the equivalent of two courses of work in their senior year. Credit may be taken either in one semester of the senior year or in both.

316. Independent Study (I or II; R) Half to full course.
Selected topics. Prerequisite: permission of the instructor.

350. Honors Thesis

355. Undergraduate Research (I or II) Half to two courses.
Undergraduate research projects in collaboration with a history department faculty member. Prerequisite: permission of the instructor.

Courses offered occasionally: 232 Europe in the 17th and 18th Centuries, 233 European State Systems, 241 Roman History, 270 Science and Technology in the U.S., 295 From Shinto to Shogun: Pre-modern Japan, 310 U.S. History to 1865

Humanities (HUMN)

Interdisciplinary courses in the humanities have been created to foster the growth of a general, liberal education outside the confines of particular disciplines or departments. These courses, which cut across conventional disciplinary boundaries, are taught by faculty from different departments, and are designed to introduce students to major writers, thinkers, and artists of various cultural traditions. Classes are limited in size so that students may share through discussion their reactions to the works studied, relate them to their own lives, and attempt to judge their relevance to the contemporary world.

Comparative Humanities Major

Program Director: Slava I. Yastremski

Christian A. Johnson Endeavor Chair in Comparative Humanities: John C. Hunter

Coordinating Committee: Maria Antonaccio, Julian Bourg, Greg Clingham, Katherine M. Faull, Susan L. Fischer, Jay Goodale, Peter Groff, John C. Hunter, Amy McCready, John Rickard, Roger Rothman, Harold Schweizer, Alfred Siewers, Carol W. White, Slava I. Yastremski

Professor: Katherine M. Faull

Associate Professors: John C. Hunter, Slava I. Yastremski

Assistant Professor: Douglas Greenfield (visiting)

The program in comparative humanities approaches Western traditions of ideas, history, literature, and art in an interdisciplinary fashion. Designed to reflect contemporary trends in humanistic scholarship, it examines issues and perspectives that conventional undergraduate disciplinary boundaries often preclude. These include the various ways in which the "Western tradition" has been constructed and represented, and the historical shifts in the way knowledge has been classified. Inasmuch as language and culture are central to this interdisciplinary project, students who declare a major in the comparative humanities are required to satisfy a language requirement.

The major consists of eight courses plus a demonstration of reading proficiency in a foreign language. The courses include:

- three period courses in humanities (HUMN 98 or HUMN 128, HUMN 150, and HUMN 250), which ground students in the broad outlines of the Western intellectual tradition.
- two interdisciplinary humanities seminars at the 300- or 400-level which encourage comparative studies across cultural, historical, and formal boundaries.
- two courses in related humanities disciplines (approved by the student's major adviser or program director), one of which is in a non-European tradition. The following courses are strongly recommended.

ART 204	Castle, Cathedral, Cloister
ART 213	History of Western Architecture
CLAS 131	Greek Civilization

CLAS 132	Roman Civilization
CLAS 141	Ancient Cities
CLAS 215	Classical Myth
CLAS 221	Heroic Epic
CLAS 224	Poetry of Passion in Greece and Rome
CLAS 231	Religions of the Ancient Mediterranean
CLAS 233	The Age of Alexander the Great
CLAS 236	The Age of Augustus
CLAS 237	Ethnicity, Gender and Identity in Antiquity
CLAS 247	Ancient Technology
CLAS 332	Classical Athens
EAST 212	Modern Japanese Literature in Translation
EAST 245	Consumption and Material Culture
EAST 251	Buddhism
EAST 256	Contemporary Japanese History
EAST 262	Sources of Asian Tradition
EAST 277	Social Darwinism: East and West
ENGL 226	Irish Studies
ENGL 240	Medieval English Literature to 1485
ENGL 258	Studies in Shakespeare (and Film)
ENGL 261	Studies in Restoration and 18th-century Literature
ENGL 270	Romantic Literature
ENGL 332	Film and Technology
FREN 336	Francophone Africa
HIST 227	American Intellectual History I
HIST 228	American Intellectual History II
HIST 231	Social History Early Modern Europe
HIST 248	Topics in Russian History
HIST 267	European Intellectual History I
HIST 268	European Intellectual History II
HIST 290	European Imperialism and Colonialism
HIST 330	European History: Reformations
LAMS 295	Topics: Retrospect 20th Century: Literature, Film, Culture
LING 220	Historical Linguistics
MUSC 204	History and Literature of Music
PHIL 206	Medieval Philosophy
PHIL 212	Philosophy of Art
PHIL 219	Problem of False Consciousness
PHIL 220	Philosophy of Science
PHIL 223	Philosophy of Religion
PHIL 230	Feminism and Philosophy
PHIL 265	Topics in Aesthetics
PHIL 266	Chinese Philosophy
PHIL 267	Islamic Philosophy
PHIL 269	Indian Philosophy
RELI 110	Introduction to Judaism, Christianity, and Islam
RELI 115	Introduction to Asian Religions
RELI 200	Buddhism

RELI 201	Islam
RELI 202	Hinduism
RELI 214	God, Nature, Knowledge
RELI 216	Philosophy of Religion
RELI 220	Comparative Ethics
RELI 221	God and Morality
RELI 243	Religions of South Asia
RELI 245	Religions of China
RELI 246	Religions of Japan
RUSS 250	Nineteenth-century Russian Literature in Translation
SPAN 222	Spanish American Literature
SPAN 285	Latino/Latina Literature in the U.S.
SPAN 424	Goya and the Drama of His Times
SPAN 462	Don Juan through the Ages
WMST 220	Introduction to Feminist Thought

- a thesis workshop or independent study for a senior thesis (HUMN 350 or HUMN 351), which gives students a chance to pursue focused research on a subject of particular interest to them. Discussion of the thesis topic must begin in the spring of the student's junior year and the topic must have attained final approval by the faculty adviser by the end of September of the senior year. The thesis project may be submitted to the Honors Council for consideration as an honors thesis but this is not required in order to complete the major.

In keeping with the program's goal of exposing student to different modes of thought, the program asks students to demonstrate work in a foreign language in addition to the eight courses required for the major. Such competency can be attained by passing a one-credit course at the level of the fourth course or higher in a particular language sequence. Students also are encouraged to develop language competency elsewhere, as in summer school or abroad; however, all such programs must first be approved by the comparative humanities program director. Students whose native language is not English, or who are bilingual, are exempted from the language requirement.

The program integrates parts of the Humanities Residential College (described under Residential Colleges on page 210) and the Humanistic Scholars Program (described under Extended Academic Programs on page 290). Members of these programs may find the major in comparative humanities particularly appropriate. The major also is especially suitable for students interested in broad study of the humanities and comparative studies, e.g., individuals otherwise focusing their education in the sciences and other non-humanities disciplines or students interested in advanced study of the humanities in graduate programs and seeking a balance of disciplinary and interdisciplinary studies for this purpose.

Students interested in the major are encouraged to contact the program director listed above as soon as possible to begin the advising process.

98. Myth, Reason, Faith (I or II; 4, 0)
This course is designed to introduce students to some of the most significant works in the Western intellectual tradition. Works by major writers from Homer to Dante will be

studied. Satisfies the Foundation Seminar requirement. May be crosslisted as CLAS 98, ENGL 98, and PHIL 98.

128. Myth, Reason, Faith (I; 3, 0)
This course follows the syllabus of HUMN 98, except that the course does not function as a Foundation Seminar. Primarily intended for sophomores who may have an interest in the Scholars Program and/or the comparative humanities major. Not open to students who have completed HUMN 98 or a crosslisted equivalent. Seniors by permission only.

150. Art, Nature, and Knowledge (I or II; 4, 0)
An interdisciplinary study of selected works in art, music, literature, science and philosophy from the Renaissance through the 19th century. No prerequisite. May be crosslisted as ENGL 150, PHIL 150, and RESC 150.

250. Nihilism, Modernism, Uncertainty (I; 3, 0)
Presents major texts, figures, and concepts of the 20th century with examples from painting, music, literature, philosophy, and science. Designed as the third course in the chronological and thematic sequence of HUMN 098 and HUMN 150. May be crosslisted as ENGL 230 and PHIL 250.

301. Humanistic Disciplines (I; R; 3, 0)
A seminar featuring study of subjects from two (or more) disciplinary approaches with emphasis on their points of intersection and convergence.

302. Historical Periods (II; R; 3, 0)
A seminar featuring comparative material from two distinct historical epochs.

303. Cultures and Traditions (I; R; 3, 0)
A seminar featuring materials from two distinct cultural expressions each possessing distinct political, social, and religious ideas and ideologies.

304. Narrative and Media (II; R; 3, 0)
A seminar featuring narrative in several forms and contexts of representation.

310. Dante and Milton (AI; 3, 0)
An intensive comparative study of Dante's *Comedy* and Milton's *Paradise Lost* as exemplars of medieval and late Renaissance understanding of human experience. May be crosslisted as ENGL 350.

319. Independent Study (I or II; R)
Individual project of study supervised by instructor. Prerequisite: permission of the instructor.

320. History of Sexuality (AII; 3, 0)
A cross-cultural and interdisciplinary examination of the signification of sexuality in literature, philosophy, scientific discourse, and the visual arts. May be crosslisted as ENGL 397.

330. Studies in Autobiography (AII; 3, 0)
A critical, cross-cultural, and transhistorical examination of the "writing of the self." Readings from Augustine, Descartes, Nietzsche, Derrida, among others.

340. Introduction to Translation Studies (AI or II; 3, 0)
Introduction to history, theory, and practice of translation. Investigation of the role of translation in intercultural communication and comparative studies.

350. Senior Thesis Workshop (I; 3, 0)
A colloquium on issues arising from the writing of a scholarly thesis. Prerequisites: senior status and permission of the instructor.

351. Honors Tutorial and Senior Thesis (I and II; 3, 0)
Independent study and research leading to the writing of a thesis as approved by the Honors Council.

398. Modern Critical Theory (AI; 3, 0)
Introduction to critical theory in the humanities, social sciences, and physical sciences. Major movements in critical theory exemplify its origins, historical trajectory, and future prospects. Crosslisted with ENGL 398.

450. Reality, Identity, Postmodernity (I and II; 3, 0)
A Capstone seminar that examines contemporary culture through a variety of artistic, socio-economic, and critical discourses. Prerequisite: permission of the instructor.

Interdepartmental Courses (IDPT)

319-320. Interdepartmental Independent Studies (I and II)
Independent study on a topic of interest to the individual student. This course may fulfill a requirement for an interdepartmental minor. Prerequisite: permission of the instructor.

351-352. Interdepartmental Major Project (I and II)
Independent research designed to unify and integrate the various courses that comprise the interdepartmental major. Prerequisite: permission of the instructor.

Interdisciplinary Studies in Economics and Mathematics (ECMA)

Program Director: Thomas C. Kinnaman

Coordinating Committee: George Exner (mathematics), James Hutton (mathematics), Thomas Kinnaman (economics), Nancy White (economics), Amy Wolaver (economics).

Mathematics has traditionally served as the language of the natural sciences, and more recently it has become a useful tool in the social sciences, particularly in economics. Developed jointly by the department of mathematics and the department of economics, the Bachelor of Science major in Interdisciplinary Studies in Economics and Mathematics at Bucknell University offers students a degree program that incorporates economics, mathematics, and statistics. This major is designed for students who are interested in combining the quantitative methods or the theoretical foundations of mathematics with the study of economics to solve economic problems. This course of study will provide strong foundations in both mathematics and economics and will offer the student both the intellectual and the quantitative skills to grapple with questions at the interface of these two disciplines.

The B.S in Interdisciplinary Studies in Economics and Mathematics provides a coordinated curriculum useful to students interested in pursuing master's or Ph.D. programs in economics, finance, business administration, or public policy. The major also prepares students for careers in finance, business, operations research or actuarial science. Modeling financial and economic phenomena mathematically has become increasingly important to securing the most prestigious positions in the financial markets.

Students interested in economics and mathematics also could consider combining a B.A. in mathematics with a B.A. in economics (double majoring), or combining a B.A. in one of these disciplines with an academic minor in the other. Students undecided among these options are encouraged to contact a member of the coordinating committee.

Requirements: The B.S. **major** in interdisciplinary studies in economics and mathematics requires a total of 18 credits, 8 from economics and 10 from mathematics.

Required Economics Courses:

- ECON 103 (Economics Principles and Problems)
- ECON 256 (Intermediate Microeconomics)
- ECON 257 (Intermediate Macroeconomics)
- ECON 258 (Intermediate Political Economy)

Each student must also select four additional economics courses in consultation with the student's academic adviser. At least two of these credits must be at the 300 level. Mathematical economics (ECON 335) and Econometrics (ECON 341) may be especially useful. Students preparing for graduate studies in economics are strongly encouraged to complete a one-credit senior thesis in economics (ECON 303-04).

Required Mathematics Courses:

- MATH 201 (Calculus I)
- MATH 202 (Calculus II)
- MATH 211 (Calculus III)
- MATH 213 (Elementary Linear Algebra)
- MATH 216 (Statistics I)
- MATH 303 (Probability)
- MATH 304 (Mathematical Statistics)

Each student must also select a 3-course track from the following three options in consultation with their academic advisor:

Theoretical track: MATH 280 (Logic, Sets, and Proofs), MATH 308 (Introduction to Real Analysis), MATH 345 (Linear Algebra)

Computational track: CSCI 203 (Introduction to Computer Science), MATH 343 (Numerical Analysis), 358 (Topics in Operations Research)

Statistical track: MATH 305 (Statistical Modeling), MATH 307 (Statistical Design of Scientific Studies), MATH 358 (Topics in Operations Research)

The recommended sequence of courses for students, semester by semester, is as follows:

First Year:	**First Semester:** ECON 103, MATH 201 **Second Semester:** ECON 256, MATH 202, MATH 216
Sophomore Year:	**First Semester:** ECON 257, MATH 211 **Second Semester:** ECON 258, MATH 213, MATH 303
Junior Year:	**First Semester:** Economics elective, MATH 304 or mathematics track course **Second Semester:** Economics elective, MATH 304 or mathematics track course
Senior Year:	**First Semester:** Economics elective, MATH 304 or mathematics track course **Second Semester:** Economics elective, mathematics track course

Please see the Economics section and Mathematics section of this catalog for a list of courses.

International Relations (IREL)

Program Director: Stephen C. Stamos Jr.

Coordinating Committee: Peter Karl Kresl, David M. Mitchell, Adrian N. Mulligan, Stephen C. Stamos, Emek M. Uçarer, Richard D. Waller, Hilbourne A. Watson

Professors: Stephen C. Stamos Jr., Hilbourne A. Watson

Associate Professors: Emek M. Uçarer, Richard D. Waller

Assistant Professors: David M. Mitchell, Adrian N. Mulligan

International relations is a field of study concerned with the cultural, economic, environmental, military, and political interactions among the major units of the world, such as states, international organizations, transnational corporations, and nongovernmental organizations. Courses from a number of departments and programs are drawn upon to offer a multidisciplinary major in international relations for the bachelor of arts degree.

The purposes of the major are to increase general knowledge about the history, institutions, interactions, and events of the international system; to develop insight into the objectives, decisions, and policies of state and nonstate actors; to provide a conceptual vocabulary and diverse theoretical perspectives to help explain and interpret international behavior; to build skills in critical analysis and evaluation of global issues; to develop an appreciation and tolerance of diversity and "others"; and to encourage value evaluation and the solving of global problems.

The international relations major provides a general education for students seeking greater knowledge about world affairs. It also provides a sound preparation for students interested in pursuing an M.A. or Ph.D. in international relations and related social sciences or a J.D. in law, and for careers in the foreign service, the federal government, international law, international business, banking and finance, international organizations, and nongovernmental organizations. International relations alumni have been accepted to the

top graduate programs and law schools in the country, and are well represented in all of the listed international careers.

Requirements: The international relations **major** consists of a minimum of 10 courses. Among these 10 courses are eight course requirements:

1. Three core disciplinary courses: ECON 227 or ECON 327, GEOG 211, POLS 170. These courses are offered in the fall and spring semesters. These three courses should be completed by the end of the junior year.
2. The international relations theory core course, IREL 250. This course should be taken either semester of the junior year. Students studying off-campus for the entire junior year should enroll in the course during the spring semester of the sophomore year. Two of the three core courses should be completed before enrolling in the theory course.
3. Three courses in an area concentration, including a history course, with no more than two of these courses in the same department. The area concentrations are: Africa, Asia, Europe, Latin America and Caribbean, Middle East, North America, and Russia and Eurasia. The acceptable history courses for each area concentration are indicated by a † on the area course lists.
4. One senior seminar in international relations. Students must enroll in a seminar either semester of the senior year, even if they previously have taken an international relations seminar. The approved seminars will be designated with a * in the official course schedule. The approved seminars ordinarily will include: ECON 317, ECON 338, HIST 311, IREL 300, IREL 310, IREL 400, IREL 425, and POLS 380. Several of the IREL seminars meet the university Capstone requirement.

The eight course requirements could be met by the completion of fewer than eight courses in certain circumstances. A single course could satisfy more than one course requirement. For example, a single history course could meet requirements for an area history and an advanced seminar. A course requirement could be fulfilled by a course recorded for another major or minor. For example, a double major in ECON/IREL could record ECON 327 as an economics course, but it would still satisfy the core course requirement for the IREL major. The entire three-course area concentration requirement could be met by taking an official minor in one of the designated areas. For example, an IREL major could minor in Latin American studies and if three of the courses in that minor were appropriate for the IREL major area concentration, the area concentration requirement would, in reality, be met. ***In any of these cases, however, the IREL major would still have to take at least 10 courses that count exclusively toward the IREL major.***

Beyond the *eight course requirements*, students will take *two additional courses* to reach a total of 10. Students may flexibly select these additional courses based on interest, but they must be from the international relations course list or be approved by your adviser. To more thoroughly cover the field, an IREL major may take *more than 10 courses,* choosing these additional courses from the IREL course list or any of the area concentration lists.

There are four additional requirements and rules of the IREL major as stipulated below:

1. At least seven courses must be taken from the international relations course list. This list consists of courses that focus primarily or substantially on relations across state and non-state boundaries.

2. Of the initial 10 courses recorded for the major, no more than five courses may be taken from one department. If a student takes more than 10 courses, then more than five courses may be taken from a single department.

3. No more than four off-campus courses will count toward the major.

4. Competence must be demonstrated in a foreign language compatible to the area concentration, normally by passing a one-credit 200-level language course on the culture or society of a country or region. The language(s) appropriate to each area concentration are presented on the area course list. If students should decide late to major in IREL and wish to begin a new language, then they must complete coursework equivalent to a fourth-level language course (e.g., SPAN 105). If no language is offered for the area concentration then an alternative foreign language will suffice. However, students will be encouraged to develop such language competence elsewhere, such as in summer school or abroad. International students, whose native language is not English, are exempted from the language requirement if they adopt an area specialization of the native language.

One semester of study abroad, preferably in a country within the regional specialization, is strongly recommended. If students are unable to study abroad in the area of specialization, overseas study could be undertaken elsewhere. Students who choose the United States as their area concentration should study abroad in the country or region of their language specialization. International students, whose native language is not English and who specialize in their native country or region, have less need for overseas study. Off-campus study in Washington, D.C., including the Washington Semester or Washington Center, also is recommended, but not as highly as overseas study. Students should contact the director of international education for information about off-campus study.

The international relations program encourages students to pursue summer internships in positions related to international relations. Students have interned in embassies abroad, as well as in government agencies in Washington, D.C. Students with high grade point averages or a scholarly bent are encouraged to apply for honors in international relations or to conduct research with a faculty member. Students planning to pursue graduate study in international relations should consider taking a course in statistics, computer science, and microeconomics and macroeconomics. Faculty advisers work closely with students interested in study abroad, internships, honors, or independent study.

International Relations Course List

CAPS 407	Challenge of Global Capitalism
CAPS 407	Political Economy of Race
CAPS 407	South Africa
CAPS 407	Trade and Imperialism
CAPS 411	Travel Writing and Place
CAPS 411	Geographies of Conflict
CAPS 411	Geographies of Nationalism
CAPS 414	America's Global Strategy Post 9/11/01
CAPS 414	Geographies of Conflict
CAPS 414	Geographies of Nationalism
CAPS 492	Images of International Business
CAPS 498	The Politics and Economics of International Environmental Aid

EAST 248	International Relations in East Asia
EAST 274	The Greater Chinese Economy
EAST 278	Asian Economic Development
EAST 340	Comparative Pacific Basin Economies
ECON 227‡	International Economics
ECON 235	African Economic Development
ECON 252	Political Economy of Global Resources
ECON 274	The Greater Chinese Economy
ECON 275	Canadian-American Economic Relations
ECON 276	Latin American Economic Development
ECON 278	Asian Economic Development
ECON 317*	Economic Integration in Western Europe
ECON 327	International Economic Theory
ECON 337	International Monetary and Financial Economics
ECON 338*	Seminar in International Economics
ECON 340	Comparative Pacific Basin Economies
ECON 357	Economic Development
ENGL 397*	Seminar in Special Topics: Caribbean Literature and Post Colonial Theory
ENGL 397*	Seminar in Special Topics: Literature and Empire
GEOG 211	Political Geography
GEOG 214	Europe in the Age of Globalization
GEOG 236	Third World Development
GEOG 311*	Topics in Advanced Political Geography
HIST 233	European State Systems
HIST 290	European Imperialism and Colonialism
HIST 292	African History II
HIST 299	Topics in Non-western History
IREL 200	International Relations Topics/Issues
IREL 218	International Relations of Europe
IREL 230	International Relations of the Caribbean
IREL 235	Modern Africa
IREL 245	Race, Nation-state and International Relations
IREL 250	Theories of International Relations
IREL 252	Political Economy of Global Resources
IREL 255	International Law
IREL 275	Global Governance
IREL 300*	Seminar: Topics in International Relations
IREL 310*	Seminar in Human Rights
IREL 323	U.S. Foreign Relations in the 19th Century
IREL 360	Independent Study
IREL 361	Independent Study
IREL 400*	Seminar: The Challenge to Global Capitalism
IREL 400*	Seminar: Global Restructuring
IREL 400*	Seminar: Latin America in Transition
IREL 400*	Seminar: Environmental Sustainability and the Global Economy
IREL 425*	Seminar: International Relations of Migration
LAMS 365*	Seminar in Latin American Studies
MGMT 393	Environment of International Business

POLS 170	International Politics
POLS 219	Latin American Politics
POLS 271	American Foreign Policy
POLS 272	U.S. National Security Policy
POLS 273	The Atlantic Alliance
POLS 274	Race, Nation-state and International Relations
POLS 275	Global Governance
POLS 278	International Law
POLS 280	War
POLS 281	Peace Studies
POLS 284	International Relations of Europe
POLS 285	International Relations of the Western Hemisphere
POLS 286	International Relations of the Caribbean
POLS 287	United States and the Middle East
POLS 288	French Foreign Policy Since 1945
POLS 289	Arab-Israeli Conflict
POLS 360	Comparative Foreign Policy
POLS 380*	Seminar in International Politics
RELI 110	Introduction to Judaism, Christianity, and Islam
RELI 115	Introduction to Asian Religions
SOCI 213	Race in Historical and Comparative Perspective
SOCI 245	Remaking America: Latin American Immigration
SOCI 311	Globalization, Technology, and Cultural Change
SOCI 409	How Holocausts Happen
UNIV 219	Peace Studies
WMST 251	Women and Development

‡ECON 103 ordinarily should be taken before enrolling in ECON 227.

*These courses satisfy the seminar requirement.
Note: With the permission of the adviser and director of the international relations program, other Bucknell courses when relevant may count for the major. Up to four off-campus courses may be included in the major.

Area concentration course list:

1. Africa: ANTH 227 (Witchcraft and Politics), ANTH 235 (Modern Africa), ECON 235 (African Economic Development), FREN 336 (Francophone Africa), GEOG 236 (Third World Development), HIST 290 (European Imperialism and Colonialism†), HIST 291 (African History I†), HIST 292 (African History II†), HIST 299 (Topics in Non-western History†) – when relevant, HIST 390 (African History†), IREL 235 (Modern Africa), POLS 211 (Third World Politics), SOCI 213 (Race in Historical and Comparative Perspective), SOCI 310 (The Sociology of Developing Societies). Language competency: French at Bucknell or abroad or indigenous African language taken off campus.
2. Asia: EAST/ANTH 246 (Japanese Culture and Society), EAST/ANTH 247 (Japanese Film as Anthropology), EAST 248 (International Relations in East Asia), EAST/ANTH 249 (Inside the Japanese Corporations), EAST/ECON 274 (The Greater Chinese Economy), EAST/ECON 278 (Asian Economic Development), EAST/ECON 340 (Comparative

Pacific Basin Economies), EAST 234/HIST 294 (China Since 1800†), EAST 255/HIST 296 (Modern Japanese History†), EAST 267/HIST 297 (The People's Republic of China†), EAST 268/HIST 264 (Intellectual Conflict in Modern China†), RELI 200/EAST 251 (Buddhism), RELI 202 (Hinduism), RELI 245/EAST 252 (Religions of China), RELI 246/EAST 253 (Religions of Japan). Language competency: Chinese or Japanese at Bucknell or abroad; other languages, such as Hindi, Thai, or Vietnamese, may be taken off campus.

3. Europe: ECON 277 (The French Economy) open only to Bucknell *en France* students, ECON 305 (Comparative Economic Systems), ECON 317 (Economic Integration in Western Europe*), ECON 324 (European Economic History†), ECON 326 (History of Economic Thought), ECON 338 (Seminar in International Economics) – when relevant, FREN 270 (La France actuelle), FREN 370 (Topics in Civilization), GEOG 214 (Europe in the Age of Globalization), GRMN 270 (The Bourgeois Era: 19th-century Germany), GRMN 272 (Modern German Culture) – when relevant, GRMN 295 (Topics in German Studies) – when relevant, GRMN 393* (Advanced Seminar in Selected Cultural Topics) – when relevant, GRMN 427 (The Culture of the Weimar Republic), HIST 233 (European State Systems†), HIST 236 (Nineteenth-century Europe†), HIST 239 (Contemporary Europe 1890-1995†), HIST 260 (Race, Nation-state and International Relations†), HIST 290 (European Imperialism and Colonialism†), HIST 323 (U.S. Foreign Relations in the 19th Century), HIST 330 (European History*†) – when relevant, IREL 218 (International Relations of Europe) ITAL 295 Topics in Italian Studies, MGMT 212 (Business, Government, Society in France) – open only to Bucknell *en France* students, POLS 223 (European Politics), POLS 251 (History of Western Political Thought II: Machiavelli to Bentham†), POLS 252 (History of Western Political Thought III: Burke to Rawls†), POLS 284 (International Relations of Europe), POLS 288 (French Foreign Policy Since 1945) – open only to Bucknell *en France* students, POLS 350 (Seminar in Comparative Politics*) – when relevant, SPAN 264 (Hispanic Topics) when relevant, SPAN 270 (Spanish Civilization), SPAN 295 (Topics in Spanish) – when relevant. Language competency: French, German, Spanish, Italian at Bucknell or abroad.

4. Latin America and Caribbean: ANTH 252 (Peoples and Cultures of the Andean World), ECON 266 (Political Economy of the Caribbean), ECON 276 (Latin American Economic Development), ECON 338 (Seminar in International Economics*) – when relevant, ENGL 397 (Seminar in Special Topics) – when relevant, GEOG 236 (Third World Development), GEOG 309 (Topics in Advanced Economic Geography), HIST 311 (U.S. History Since 1865: Foreign Relations*†), IREL 230 (International Relations of the Caribbean), IREL 400 (Latin American Economic Transition), LAMS 297 (Latin American History†), LAMS 365 (Seminar in Latin American Studies*), POLS 211 (Third World Politics), POLS 219 (Latin American Politics), POLS 285 (International Relations of the Western Hemisphere), POLS 350 (Seminar in Comparative Politics*) – when relevant, SOCI 213 (Race in Historical and Comparative Perspective), SOCI 290 (Sociology of Caribbean Society), SOCI 310 (The Sociology of Developing Societies), SPAN 264 (Hispanic Topics) – when relevant, SPAN 280 (Spanish American Civilization). Language competency: Spanish at Bucknell or abroad.

5. Middle East: HIST 290 (European Imperialism and Colonialism†), POLS 224 (Government and Politics of the Middle East†), POLS 287 (United States and the Middle East†), POLS 289 (Arab-Israeli Conflict), RELI 201 (Islam), RELI 210 (Judaism). Language competency: Hebrew or Arabic.

6. North America: ECON 275 (Canadian-American Economic Relations), ECON 318 (American Economic History†), FREN 335 (Literature and Culture of Quebec), HIST 311 (U.S. History Since 1865: Foreign Relations*†), POLS 140 (American Politics), POLS 232 (American Public Policy Analysis), POLS 252 (History of Western Political Thought III: Burke to Rawls†), POLS 271 (American Foreign Policy), POLS 272 (United States National Security Policy). Language competency: any language, other than English, taken at Bucknell or abroad.
7. Russia and Eurasia: HIST 248 (Topics in Russian History†), POLS 222 (Russian Politics†), RUSS 302 (Twentieth-century Russian Culture and Civilization). Language competency: Russian taken at Bucknell or abroad.

*These courses satisfy the seminar requirement.
†These courses in each area satisfy the history requirement.

The international relations **minor** shall consist of at least five courses drawn from the course list below, with no more than three in the same department. Two out of three core courses, ECON 227, GEOG 211, POLS 170, must be taken, although it is recommended that all three courses be selected.

CAPS 407	Trade and Imperialism
EAST 248	International Relations in East Asia
EAST 274	The Greater Chinese Economy
EAST 340	Comparative Pacific Basin Economies
ECON 227	International Economics
ECON 252	Political Economy of Global Resources
ECON 274	The Greater Chinese Economy
ECON 275	Canadian-American Economic Relations
ECON 276	Latin American Economic Development
ECON 317	Economic Integration in Western Europe
ECON 327	International Economic Theory
ECON 337	International Monetary and Financial Economics
ECON 338	Seminar in International Economics
ECON 340	Comparative Pacific Basin Economies
ECON 357	Economic Development
GEOG 211	Political Geography
GEOG 311	Topics in Advanced Political Geography
HIST 233	European State Systems
HIST 290	European Imperialism and Colonialism
HIST 292	African History II
HIST 311	U.S. History Since 1865: Foreign Relations
HIST 323	U.S. Foreign Policy in the 19th Century
IREL 200	International Relations: Topics/Issues
IREL 218	International Relations of Europe
IREL 230	International Relations of the Caribbean
IREL 245	Race, Nation-state and International Relations
IREL 250	Theories of International Relations
IREL 252	Political Economy of Global Resources
IREL 255	International Law
IREL 300	Seminar: Topics in International Relations

IREL 310	Human Rights
IREL 323	U.S. Foreign Policy in the 19th Century
IREL 360	Independent Study
IREL 361	Independent Study
IREL 400	Seminar: The Challenge to Global Capitalism
IREL 400	Seminar: Global Restructuring
IREL 400	Seminar: Latin America in Transition
IREL 400	Seminar: Environmental Sustainability and the Global Economy
IREL 425	Seminar: International Relations of Migration
LAMS 365	Seminar in Latin American Studies
MGMT 374	International Finance
MGMT 393	Environment of International Business
POLS 170	International Politics
POLS 271	American Foreign Policy
POLS 272	U.S. National Security Policy
POLS 273	The Atlantic Alliance
POLS 274	Race, Nation-state and International Relations
POLS 275	Global Governance
POLS 278	International Law
POLS 280	War
POLS 281	Peace Studies
POLS 284	International Relations of Europe
POLS 285	International Relations of the Western Hemisphere
POLS 286	International Relations of the Caribbean
POLS 287	United States and the Middle East
POLS 288	French Foreign Policy Since 1945
POLS 289	Arab-Israeli Conflict
POLS 380	Seminar in International Politics
SOCI 311	Globalization, Technology, and Cultural Changes
UNIV 219	Peace Studies

200. International Relations: Topics/Issues (I or II; R; 3, 0)
Selected topics in international relations.

218. International Relations of Europe (I; 3, 0)
This course will examine the foreign policies of European countries, individually and collectively through the European Union, toward each other, regional and global intergovernmental organizations, and other regions/countries. Crosslisted as POLS 284.

230. International Relations of the Caribbean (II; 3, 0)
Study of the domestic and external sources of foreign policy and of foreign policy issues of Caribbean states, including regional integration and U.S.-Caribbean relations. Crosslisted as POLS 286.

235. Modern Africa (I; 3, 0)
Introduction to complexity, richness, and vitality of contemporary African cultures. Interdisciplinary perspectives on issues including economy, politics, family and community, art, literature, religion. Crosslisted as ANTH 235.

245. Race, Nation-state and International Relations (II; 3, 0)
The course examines the processes by which states as expressions of social relations that are embedded in political institutions have been used by social forces, nationally, and transnationally, to racialize nations, societies, and global politics. Crosslisted as HIST 260 and POLS 274.

250. Theories of International Relations (II; 3, 2)
Analysis and evaluation of main theories of international relations, including realist, neo-liberal, Gramscian, Marxist, feminist post-modernist approaches. Theories are related to the major dimensions of international relations. Prerequisites: two international relations core courses, second semester sophomore status.

252. Political Economy of Global Resources (I or II; 3, 0)
A study of environmental and energy economics in the context of global resources and politics. The theme of sustainable development will be linked to the new realities of international relations. Prerequisite: ECON 103. Crosslisted as ECON 252 and UNIV 252.

255. International Law (II; 3, 0)
The nature, historical development, and sources of international law; substantive and procedural international law and its role in international relations. Crosslisted as POLS 278.

275. Global Governance (I or II; 3, 0)
This course explores the rationales, processes, and institutions of multilateral governance in a globalized world. We examine the U.N., nongovernmental organizations, conflict resolution, economic development, environment, human rights, and international law. Not open to first-year students. Crosslisted as POLS 275.

300. Seminar: Topics in International Relations (I or II; R: 3, 0)
Selected topics. Prerequisites: junior or senior status and permission of the instructor.

310. Human Rights (II; 3, 0)
The seminar will study human rights, primarily from an international perspective, including self-determination, cultural rights, ethnic and racial rights, women's rights, religious rights, and gay and lesbian rights. Prerequisite: permission of the instructor. Preference given to international relations majors.

323. U.S. Foreign Policy in the 19th Century (I or II; 3, 0)
This course examines American political and economic expansion from independence to the early 20th century. Crosslisted as HIST 323.

360 and 361. Independent Study (I, II; R; TBA) Half or full course.
Open to international relations majors who wish to pursue individual programs of reading, research, or writing under the supervision of a professor, usually for completion of the honors thesis. Prerequisite: permission of the supervising IREL professor.

400. Seminar: Topics in International Relations (I and II; R; 3, 0)
Selected topics of international relations at an advanced level for Capstone credit. Regularly taught topics are: Global Restructuring, Latin America in Transition, Environmental Sustainability and the Global Economy. Prerequisites: second semester junior or senior status and permission of the instructor.

425. International Relations of Migration (II; 3, 0)
This course will examine the causes and the international consequences of human displacement. It will consider the economic, political, social, and cultural components of international migration. Crosslisted as POLS 425.

Latin

See Classics

Latin American Studies (LAMS)

Coordinating Committee: Thomas C. Greaves, LaVonne C. Poteet, Alice J. Poust, Stephen C. Stamos Jr. (Director), Paul H. Susman, Peter Wilshusen

Associate Professor: LaVonne C. Poteet

Latin American studies provides a framework, through interdisciplinary study in the humanities and social sciences, for systematic understanding of the Latin American cultural and historical experience and of the important role of Latin America in the world. Students examine its rich chronicle of traditions, cultural expression, and historical experience and are encouraged to pose questions on a wide range of essential issues, ranging from multi-racial interaction, cultural syncretism, and transcendent values to economic struggle, human rights, globalization, and the quality of life. Through the LAMS major, students develop broader perspectives on their own culture. These perspectives, combined with an expanded international world view, increased sensitivity to inter-American relations, and extensive study of the Spanish language, bring depth and sophistication to the major.

A minimum of eight courses is required for the **major**. Each student must take the following courses:

LAMS 295	Topics in Latin American Studies
LAMS 297	Latin American History
LAMS 365	Seminar in Latin American Studies
SPAN 280	Spanish American Civilization

At least three courses must be elected from among the following:

ANTH 252	People and Cultures of the Andean World
ECON 276	Latin American Economic Development
GEOG 236	Third World Development
IREL 230	International Relations of the Caribbean
LAMS 319	Independent Study
POLS 211	Third World Politics
POLS 219	Latin American Politics
POLS 285	International Relations of the Western Hemisphere
SOCI 290	Sociology of Caribbean Society
SOCI 310	Sociology of Developing Societies
SPAN 222	Spanish American Literature
SPAN 285	Latino/Latina Literature in the U.S.
SPAN 324	Twentieth-century Spanish American Literature

SPAN 351	Women's Writing in the Spanish-speaking World*
SPAN 361	Topics in Hispanic Literature*
SPAN 362	Topics in Hispanic Literature*
SPAN 365	Topics in Spanish American Civilization
SPAN 461	Topics in Hispanic Literature*
SPAN 462	Topics in Hispanic Literature*
SPAN 465	Topics in Spanish American Civilization

* When content is predominately on Latin American topics.

Students who are pursuing honors in Latin American studies, and who are enrolled in LAMS 319 (Independent Study), may be exempted from LAMS 365.

Additional courses with substantial Latin American content may be elected from the list of approved courses offered each semester in the *Class Schedule* booklet.

Competence in the fundamental skills of the Spanish language equivalent to the beginning of the sixth semester of college Spanish at Bucknell is expected of Latin American studies majors and is necessary to enroll in SPAN 280, a required course.

Students complete the interdepartmental **minor** in Latin American studies when they successfully complete at least five courses from the lists above.

Students majoring in Latin American studies should plan a semester or a year of study in Latin America. Students should consult, when they elect the Latin American studies major, with their adviser, with the director and members of the coordinating committee, and with the Office of International Education, regarding suitable foreign study opportunities. Exceptions must be approved by the director. Bucknell University courses required of Latin American studies majors will be waived by the adviser in exchange for equivalent courses taken abroad.

Independent study for the major or for the minor may be taken by enrolling for LAMS 319 with any member of the coordinating committee (or with another faculty member, with the approval of the director). Students must submit a written proposal of the independent study project, endorsed by the sponsoring faculty member, to the director of Latin American studies. No more than one independent study course shall be included in the minor.

The program strongly encourages qualified majors to consider working for honors in Latin American studies. Such students should consult during their junior year with one or more members of the faculty of the program, to begin defining a research topic and writing a proposal. The proposal is to be approved by the Latin American Studies Steering Committee, and submitted to the Honors Council by mid-October of the senior year. Normally, an honors student will enroll for one independent study (LAMS 319) credit each semester of the senior year. Further information about the honors program may be obtained from the academic adviser, from the director of the program in Latin American studies, or from the Honors Council.

150. Latin America: An Introduction (I; 3, 0)
The complex and fascinating civilizations of Latin America are explored through literature, cinema, and the social sciences.

295. Topics in Latin American Studies (I or II: R; 3, 0)
Selected Latin American topics. May be given in Spanish.

297. Latin American History (I; 3, 0)
General survey from pre-Columbian times to the present. Selected themes, texts, and countries will be studied in depth.

319. Independent Study (I or II; R: 3, 0)
Individual research under direction of a member of the Coordinating Committee. Prerequisite: permission of the instructor.

365. Seminar in Latin American Studies (I, II; R; 3, 0)
Interdisciplinary topics in Latin American studies. Normally team-taught. Required of majors in Latin American studies, and open to others. May be given in Spanish. Prerequisite: permission of the instructors.

Legal Studies Minor

Coordinators: John Bridges, Matthew Silberman

The legal studies minor requires at least five courses outside the student's major chosen from the list of designated courses. No more than three of these courses may be in a single department. For a minor in legal studies, the list of designated courses is as follows:

1. The student must select three from the following list of regularly offered courses:

CAPS 431	Women and the Penal System
ECON 330	Law and Economics
ENGL 460	Law and Literature
ENST 260	Environmental Law
IREL 255/POLS 278	International Law
MGMT 220	Business Law I
PHIL 100	The Fields and Functions of Philosophy: Law, Morality, and Society
POLS 244	American Judicial Politics
POLS 260	Topics in Legal Thought
POLS 261	Twentieth-Century American Legal Thought
POLS 263	Race and Ethnicity in American Legal Thought
POLS 290	Topics in Politics: Constitutional Law
RELI 280	Religion and Constitutional Law
RELI 310	Topics in Religion and Law
SOCI 123	Law and Society
SOCI 234	Criminology
SOCI 251	Violence and Society
SOCI 433	Seminar in Law and Society

2. The student must select one course from the following list of law-related courses:

ANTH 227	Witchcraft and Politics
ENST 255	Environmental Justice
IREL 310	Human Rights
PHIL 213	Ethics
PHIL 214	Social and Political Philosophy

PHIL 228	Contemporary Ethical Theory
PHIL 311	Ethics and the Natural World
POLS 240	The American Congress
POLS 256	Topics in Social and Political Ethics
POLS 380	Human Rights
RELI 125	Introduction to Ethics
RELI 220	Comparative Religious Ethics
RELI 226	Environmental Ethics
RELI 227	Bioethics: Issues in Ethics, Medicine, and the Life Sciences
SOCI 239	Deviance and Identity
UNIV 228	Legal and Ethical Issues of the Press

3. The student must select one course designed to be integrative in nature. This can be accomplished by taking an approved 300-level seminar or Capstone course, or by taking a 300-level independent studies course. The following courses have been approved:

IDPT 319	Interdepartmental Independent Studies: Legal Studies
IDPT 320	As above
SOCI 433	Seminar in Law and Society

Independent study may be taken with any member of the faculty who teaches courses in list 1. The student must submit a written proposal along with the sponsoring faculty member's endorsement to the legal studies coordinator.

Linguistics

See Foreign Language Programs

Management (MGMT)

Professors: William R. Gruver, Distinguished Clinical Professor of Management and Executive-in-Residence (adjunct), Elton G. McGoun, Paul Shrivastava

Associate Professors: Douglas E. Allen (Chair), Mark S. Bettner, Michael P. Coyne, Jamie R. Hendry, Tammy B. Hiller, David E. Jansen, Robert A. Needham (adjunct), Eric L. Santanen, Nancy C. Weida, Stephen D. Willits, Christopher J. Zappe

Assistant Professors: Matthew D. Bailey, Mihai Banciu (visiting), Mark A. Ciavarella, Jordi R. Comas, J. Richard Harvey (visiting), Michael E. Johnson-Cramer, Ranganaath Murthy (visiting), Alia C. Stanciu (visiting), Janice M. Traflet

Lecturers: Paul W. Brann, John P. Fernsler, Mary F. Leshinski

The study of management and accounting prepares students to think critically and communicate effectively about the economic, social, political, and cultural issues that they will face throughout their careers. Coursework in management and accounting develops one's capacity to make decisions, take action, and stimulate performance to achieve personal and organizational goals. Accordingly, the department offers elective courses to students in all degree programs in the firm belief that students who may not intend to pursue careers in management should have the opportunity to become familiar with the basic structures, operating mechanisms, and management principles governing business, public, and not-for-profit institutions.

The department of management provides curricula leading to the bachelor of science in business administration (BSBA) degree, with majors in management or accounting. Majors compete successfully for jobs in banking, finance, marketing, human resource management, and other for-profit and not-for-profit fields. Many management and accounting graduates, after working several years, return to M.B.A. programs at major universities such as Chicago, Columbia, Harvard, Northwestern, Stanford, or Virginia. Many other graduates go on to pursue Ph.Ds, law degrees, and other advanced programs of study.

Accounting majors are actively recruited by major CPA firms and numerous global enterprises. The curriculum in accounting provides a solid foundation for students who may wish to qualify as Certified Public Accountants (CPAs) or to receive the Certificate in Management Accounting (CMA). Students should consult an adviser to develop a program that may meet specific educational requirements for these certificates. Bucknell's BSBA-accounting students desiring to take the CPA exam have various avenues which may satisfy the 150-hour educational requirement imposed by many states. Although members of the department will advise students concerning course selection, the student is responsible for choosing those courses and experiences that meet specific states' requirements to sit for the qualifying exams.

Applying to major in management or accounting. The number of students admitted to the BSBA degree program at Bucknell University is limited. Students who wish to seek the BSBA degree, with a major in either management or accounting, and who were not directly admitted to that degree when admitted to the university, must submit a completed application to the department by September 10 of the sophomore year. When the number of applications exceeds the threshold established by the department and the dean's office, criteria for acceptance will emphasize academic achievement, especially in the four core courses noted in the following paragraph. Questions regarding this process should be directed to the department chair.

By the end of the third semester, students ordinarily will have completed four core courses: MATH 192 or MATH 201, MGMT 101, MGMT 160, and ECON 103. It should be noted that admission to the BSBA degree program is possible without having completed all four core courses; students should complete them by the end of the sophomore year. Beginning with the second semester of the sophomore year, BSBA students pursue courses required to complete a major in accounting or management and may elect advanced courses within program areas such as finance, marketing, management information systems, operations management, human resources, or accounting.

Prospective applicants are encouraged to meet with management or accounting faculty during their first year of study to discuss important advising issues. BSBA candidates are encouraged to sample among courses offered in all divisions of the university, in the conviction that an effective foundation for continuing professional development in any discipline is built upon the ideas and ideals of a liberal education.

Requirements. BSBA **majors** in either **accounting** or **management** must fulfill all university degree requirements, including the Common Learning Agenda, and the following:

Twelve BSBA core requirements: MATH 201 or MATH 192, MGMT 101, MGMT 160, MGMT 161, MGMT 220, MGMT 242, MGMT 340, MGMT 370, MGMT 380, ECON 103 and ECON 256, and one of the following: CLAS 247, CSCI 180, CSCI 203, ENGR 100, ENGR 270, ENST 211, HIST 170, HIST 270, or MGMT 240. (Students should consult with their advisers to select the course from this list that most appropriately meets their educational objectives.)

Required courses for majors:

Accounting: MGMT 250, MGMT 251, MGMT 359 or MGMT 319, MGMT 365, and one of MGMT 353, MGMT 354, or MGMT 357.

Management: MGMT 312, MGMT 319, MGMT 341, and one of MGMT 330, MGMT 335, MGMT 336, or MGMT 339.

A recommended sequence for the bachelor of science in business administration majors is as follows:

First Year*	**First Semester:** ECON 103 **Second Semester:** MATH 201 or MATH 192, MGMT 160
Sophomore Year*	**First Semester:** MGMT 101 **Second Semester:** ECON 256, MGMT 161, MGMT 242
Junior Year*	**Management Majors:** MGMT 220; MGMT 340; MGMT 370, MGMT 380, and electives** **Accounting Majors:** MGMT 220, MGMT 250, MGMT 251, MGMT 340, MGMT 370, MGMT 380, and electives**
Senior Year*	**Management Majors:** MGMT 312; MGMT 319; MGMT 330, MGMT 335, MGMT 336, or MGMT 339; MGMT 341; and electives** **Accounting Majors:** MGMT 359 or MGMT 319; MGMT 365; MGMT 353 or MGMT 354 or MGMT 357; and electives**

*All BSBA students also are required to elect one of the following: CLAS 247, CSCI 180, CSCI 203, ENGR 100, ENGR 270, ENST 211, HIST 170, HIST 270, or MGMT 240. (Students should consult with their advisers to select the course from this list that most appropriately meets their educational objectives.) Students should consult with a member of the management department faculty to discuss these and other courses that also may fulfill this requirement.

Other course sequences are possible. See "Suggested BSBA Course Schedule" available in the management department office or from any management faculty member.

**Management majors are limited to four non-accounting management electives; accounting majors are limited to four accounting electives.

All accounting and management majors must meet a Common Learning Agenda Capstone Experience requirement.

Majors are encouraged to pursue off-campus study, either abroad or in approved domestic programs. Many off-campus programs also include internship opportunities. BSBA students may take a maximum of two required management courses in non-Bucknell programs.

The department may assist students in arranging special programs to include study abroad, independent work, field projects and internships, and acceleration in the fulfillment of BSBA requirements. Well-qualified juniors and seniors are invited by the faculty to participate in the departmental honors programs, consisting of participation in advanced seminars and the preparation of honors theses.

Bachelor of Management for Engineers Degree

The bachelor of management for engineers degree is open to students admitted to the five-year joint degree program in engineering and management (see Program in Engineering and Management, page 247). The program leads to the joint degree, the bachelor of science in engineering degree (within a specific engineering discipline), and the bachelor of management for engineers degree.

All University degree requirements, including the Common Learning Agenda, must be fulfilled along with the following eight BSBA course requirements: MGMT 101 Introduction to Organizations and Management; MGMT 160 Foundations of Accounting and Financial Management I or MGMT 161 Foundations of Accounting and Financial Management II; MGMT 220 Business Law; MGMT 370 Corporate Finance; MGMT 380 Marketing; MGMT 312 Business, Government and Society; MGMT 319 Business Strategy; and a 300-level management elective. Students in this program may satisfy one of the management courses through transfer of credit from a non-Bucknell program, with prior approval of the management department. Suggested course sequences for the program and detailed information on the degree requirements are available from the department of management or the Office of the Dean of Engineering.

General Management

101. Introduction to Organization and Management (I or II; 3, 3)
Management theory and practice. Policy formulation, decision making, strategic and operational planning, organization structure and behavior, managerial responsibility and career paths. Includes company project laboratories. Primarily for first-year students, sophomores, and juniors. Not open to students who have taken MGMT 318.

212. Business, Government, and Society in France (I; 3, 0)
Political, legal, economic, and social context of business in France. Offered for students in the Bucknell *en France* program. (Consult with the BEF and management advisers.)

285. Leadership in Management and Technology (S; 1.5) Half course.
Interdisciplinary program for leadership in technology and management; macro and micro perspectives, design and TQM, ethical/professional considerations, environmental and energy management. Open only to students admitted to the Institute for Leadership in Technology and Management. Prerequisite: permission of the instructor. Crosslisted as ENGR 285.

300. Senior Thesis (I or II)
Individual supervised project. Prerequisites: for majors only and permission of the instructor.

301. Independent Study (I or II; R) Half to two courses.
Individual study or projects, supervised by instructor. Prerequisite: permission of the instructor.

305. New Venture Formation and Management (I or II; 3, 0)
An experiential course addressing unique aspects of forming new ventures. Emphasis on the contributions new ventures make to the economy and society as a whole, the characteristics of entrepreneurs, the special challenges facing small businesses, and the process of starting a new venture. The primary course activity is the construction of a business plan for a prospective new venture. Prerequisites: MGMT 370 and MGMT 380.

312. Business, Government, and Society (I or II; 3, 1)
Focuses on the social and political environments in which firms operate. Includes topics such as ethical decision-making, managing multiple stakeholder (market and non-market) relationships, business involvement in the public policy process, and the role of the multinational firm in the global economy. Prerequisite: MGMT 101.

315. Special Topics in Management (I or II; R; 3, 3)
A seminar on selected topics in management. Prerequisite: permission of the instructor.

317. Seminar on Crisis Management (II; 3, 1)
This seminar examines the causes and consequences of industrial crises. Participants learn basic concepts of crisis management and analyze recent cases of corporate crises.

318. Management Theory and Practice (I or II; 3, 1)
Survey and integration of theory and research literature; managerial effectiveness; organization design; decision making; management activities, functions, and careers; power, authority, and leadership; organization change. An introductory management course for seniors and graduate students, as an alternative to MGMT 101. Not open to students who have taken MGMT 101. Prerequisite: permission of the instructor.

319. Management Strategy and Policy (I and II; 3, 0)
An analysis of the concept of strategy as the basis for understanding the corporation as a social institution; application of strategy as a problem of interdependent choice among stakeholders in a global context. Prerequisites: MGMT 370 and MGMT 380; senior level course.

385. Internship in Management and Technology (S; 1.5, 0) Half course.
Internship in complex management challenges, the integral role of technology in organizations, and interdisciplinary decision making. Open only to students admitted to the Institute for Leadership in Technology and Management. Prerequisites: MGMT 285 and permission of the instructor. Crosslisted as ENGR 385.

390. Honors Course – Management (I or II; R)
Special and independent studies for BSBA students selected under guidelines of the department and the University Honors Council. Honors thesis required. Prerequisite: nomination by the department.

393. Environment of International Business (I; 3, 0)
Cultural impacts on international business operations and management.

419. Strategic Thinking (I or II; 3, 0)
This course is designed to acquaint students with the history of strategy, introduce theories of strategic analysis, relate specific functional concepts and encourage an objective, broader, longer term, more critical orientation beyond the world of business. Satisfies Capstone and MGMT 319 requirement. Not open to students who have taken MGMT 319. Prerequisite: senior-level BSBA majors only.

Management and Law

220. Business Law I (I and II; 3, 1)
Survey of the judicial system, followed by an analysis of contract law and government regulation of business using lecture and case method. Not open to first-year students.

221. Business Law II (II; 3, 0)
Continuation of MGMT 220 with an analysis of the Uniform Commercial Code in the area of sales and commercial paper; the law of agency, partnerships, and corporations. Prerequisite: MGMT 220.

Organization and Human Resources Management

330. Human Resources Management (I or II; 3, 0)
Focus is on how human resource management practices can create competitive advantages for organizations and the impact of those practices on employees and communities. Topics include employment law, managing diversity, managing the size and composition of the workforce, job analysis, recruitment, selection, training and development, compensation, performance evaluation, union-management relations, career management, and employer and employee rights. Prerequisite: MGMT 101.

335. Seminar in Organization Studies (I or II; R; 3, 0)
Special topics in organizational behavior, organization theory and design organization development, human resources management, and related topics. Seminar discussions of current theory and research. Fulfills BSBA distribution requirements in organization studies. Prerequisites: MGMT 101 (or equivalent) and permission of the instructor.

336. Organizational Behavior (I or II; 3, 0)
Focus is on explaining, predicting, and influencing the behavior of individuals and groups in organizations. Topics include challenges of managing in current organizations, integrating multiple perspectives, perception, motivation, making teams work, internal and external team processes, leadership, power and politics, communication, conflict, organizational culture, managing organizational change, stress management, and individual career management. Prerequisite: MGMT 101 or permission of the instructor.

339. Organization Theory (II; 3, 0)
Focuses on describing organizations and understanding how they interact with their environment. Topics covered include: organizational structure and design, organizational culture, power and authority dynamics, economic approaches to organization, and managing organizational change and development. We use these concepts to explain why organizations emerge, survive, prosper, and evolve. Prerequisite: MGMT 101.

Decision and Information Sciences

240. Introduction to Information Systems (I or II; 3, 0)
This course explores different types of information systems (IS) and the various business functions for which they are used within organizations. Topics include using IS to gain strategic advantage, conducting electronic commerce, managing supply chains, data warehousing and analysis, knowledge management, information systems security, and the impacts of IS upon individuals, organizations and society. Special focus is placed upon current events and hands-on organizational study.

242. Managerial Statistics (I or II; 3, 1)
Introduction to statistics and its applications to managerial decision making. Theory and use of probability, probability distributions, hypothesis testing, confidence intervals, regression, sampling, quality control, and forecasting. Prerequisite: MATH 201 or MATH 192.

340. Decision Sciences (I or II; 3, 1)
This course is concerned with understanding and improving the decision making of individuals and groups in organizations. At issue is not only how decision makers model and solve problems, but also how they came to identify such problems and learn from the results of their actions. Prerequisites: MGMT 242 and MATH 192 or MATH 201.

341. Operations Management (I or II; 3, 0)
Design, analysis, operation, control and improvement of production and service systems; strategic decision making, forecasting, total quality management, process control, layout, inventory control, just-in-time, waiting-line analysis and location. Prerequisites: MGMT 242 and MATH 192 or MATH 201.

342. Special Topics in Information Systems (I or II; R; 3, 1)
Provides focused study on particular topics in information systems. Potential topics include management of information systems, group support systems, electronic-commerce, analysis and design of information systems, and human computer interaction. Emphasis is placed on interactive group projects and managerial implications.

346. Special Topics in Decision Sciences (I or II; R; 3, 3)
Provides focused study on particular topics in the decision sciences. Possible topics include optimization, simulation, game theory, decision theory, forecasting, and complexity. Emphasis on applications involving managerial decision making. Prerequisite: MGMT 340 or permission of the instructor.

348. Decision Support Systems (I or II; 3, 0)
Provides an overview of the characteristics, concepts, methodology, and techniques involved in effective decision support systems. Executive workstations, computer graphics, simulations, and applications to strategic planning. Prerequisites: MGMT 342 and MGMT 340.

Accounting

160. Foundations of Accounting and Financial Management I (I and II; 3, 1)
An introduction to accounting and financial management theory and practice. The course provides students with a foundation in financial statement preparation and analysis, financial forecasting and modeling, operational budgeting, cost-volume-profit analysis, and capital budgeting. In addition, the course introduces students to financial markets and risk analysis, and underscores the importance of ethical financial reporting.

161. Foundations of Accounting and Financial Management II (I and II; 3, 1)
Fundamentals of corporate financial reporting. Interpretation and preparation of general purpose financial statements. Prerequisite: MGMT 160 or permission of the instructor.

250. Intermediate Accounting I (I or II; 3, 1)
Accounting theory and practice applicable to the determination of income and the valuation of assets. This course takes a "critical thinking" approach to financial accounting and reporting that develops students' understanding of the environment in which accounting choices are made. Prerequisites: MGMT 160 and MGMT 161.

251. Intermediate Accounting II (I or II; 3, 1)
A continuation of MGMT 250. This course also takes a "critical thinking" approach with particular emphasis on accounting and valuation issues related to liabilities and stockholders' equity. Prerequisite: MGMT 250 or permission of the instructor.

350. Honors Course – Accounting (I or II)
Special and independent studies for BSBA students selected under guidelines of the department and the University Honors Council. Honors thesis required. Prerequisite: nomination by the department.

353. Advanced Accounting (I or II; 3, 1)
Accounting theory and practice applicable to business combinations, foreign currency translation, SEC, partnership, and governmental reporting. The course also examines how and why financial accounting standards are developed. Prerequisite: MGMT 251 or permission of the instructor.

354. Tax Accounting I (I or II; 3, 1)
Survey of federal income taxes with emphasis placed on individual tax law and practice. Other topics include fundamentals of corporate and pass-through entity taxation and federal gift and estate taxation. The student will research and interpret tax law, study the social and economic implications of tax law, and prepare federal income tax returns. Prerequisites: MGMT 160 and junior status or permission of the instructor.

355. Tax Accounting II (S; 7.5, 0)
A study of advanced topics of federal income, gift, and estate taxation. Prerequisite: MGMT 354.

357. Auditing (I or II; 3, 1)
The concept of auditing and its professional standards and environment are examined to understand audit risk analysis, accounting systems and controls, decision making, and evidence accumulation. Prerequisite: MGMT 161.

359. Advanced Seminar in Accounting (II; 3, 1)
An integrative seminar addressing special topics and current issues faced by the accounting profession. The course bridges the gap between accounting theory and accounting practice. Prerequisite: permission of the instructor.

365. Cost Accounting (I or II; 3, 1)
Basic consideration of cost principles, procedure, control, and analysis. Emphasizes use of costs for analytical and decision-making purposes. Prerequisite: MGMT 160.

Finance

370. Corporate Finance (I or II; 3, 0)
Principles of corporate finance theory and management. Lectures and case discussions. Topics include financial analysis and planning, working capital management, capital budgeting, long-term financing and capital structure, and dividend policy. Prerequisite: MGMT 160 or MGMT 161.

372. Cases in Corporate Finance (I or II, 3, 0)
Applied corporate finance strategy, including mergers and acquisitions, making intensive use of the case method. Classroom participation and group presentations are heavily emphasized. Prerequisites: MGMT 370 and permission of the instructor.

374. International Finance (I or II; 3, 3)
Fundamentals of foreign exchange markets and international financial markets, international capital budgeting, hedging foreign exchange risks. Prerequisite: MGMT 370 or permission of the instructor.

375. Student Managed Investment Fund I (I; 3, 3)
First semester of a year-long course in which students manage a real dollar investment portfolio. Provides hands-on experience in portfolio management, including economic, industry, and company analysis, and decision making. MGMT 375 is a prerequisite course which carries no credit, but when combined with MGMT 476 and successfully completed gives the student two course credits. Prerequisites: MGMT 370 and MGMT 377, senior status, and permission of the instructor. Application must be submitted on or around March 15 of the junior year.

377. Investments (I or II; 3, 0)
Principles of investment practice and theory. Emphasis is placed on the fundamentals of intangible investments (equities, debt and derivative instruments). Other topics include the nature and operation of securities markets, security valuation, company and industry analysis, portfolio construction and management. Selected topics unique to the current investment environment are included on an ad hoc basis. Prerequisites: MGMT 160, MGMT 242, MGMT 370, and permission of the instructor.

378. Investment Banking (I or II; 3, 0)
An economic, historical, and social perspective on the industry from its origin to the present with emphasis on current practices. Prerequisite: junior or senior status.

476. Student Managed Investment Fund II (II; 3, 3) Two courses.
Continuation of a two-semester course in which students develop experience in security research and analysis, asset valuation, asset allocation, and portfolio management by managing a real dollar investment portfolio. Prerequisites: MGMT 375, MGMT 377 and permission of the instructor.

Marketing

380. Principles of Marketing (I or II; 3, 1)
The role of the marketing function in the organization. Concepts, philosophies, techniques, and theories pertaining to the exchange process of products and services between institutions and their customers. Prerequisites: ECON 256 and MGMT 101, or permission of the instructor, junior or senior status.

382. Marketing Research (I or II; 3, 0)
Study and application of scientific research methodology. The marketing research process is studied in depth, including the application of statistical techniques to marketing problem solving. Prerequisites: MGMT 242 and MGMT 380 or permission of the instructor.

384. Consumer Behavior (I or II; 3, 0)
Study of consumer buying decision processes within context of marketing strategies. Topics include models of information processing and product evaluation; historical changes in role of culture in assigning meaning to goods as indicators of social status; the diffusion of innovation; and marketing consumer products in international markets. Prerequisite: MGMT 380 or permission of the instructor.

386. Special Topics in Marketing (I or II; R; 3, 3)
A seminar on selected topics in marketing. Prerequisites: MGMT 380 and permission of the instructor.

389. Marketing Management (I or II; 3, 1)
Managerial decision making within the context of the marketing environment. The objectives are (1) to increase the student's familiarity with the field of marketing and (2) to develop the student's capacity for making marketing decisions based on analysis. Prerequisite: MGMT 380.

Courses offered occasionally: 103 Communication for Management, 308 Economic Organization Theories, 347 Business Conditions and Forecasting, 360 Accounting Theory, 367 Nonprofit Organization Accounting

Mathematics (MATH)

Professors: George R. Exner, Michael R. Frey, Pamela B. Gorkin, Paul J. McGuire, Allen R. Schweinsberg, Howard Smith

Associate Professors: Carmen O. Acuña, Gregory T. Adams, M. Lynn Breyfogle, Thomas Cassidy, Ulrich Daepp (Chair), James E. Hutton, Karl A. Voss

Assistant Professors: Karen Boomer, Peter A. Brooksbank, Emily Dryden, Sharon A. Garthwaite, Peter McNamara, Matthew S. Miller (visiting), Anjela Pile (visiting), Nathan C. Ryan, Linda B. Smolka

Instructor: Amy M. Donner (visiting)

Mathematics has for centuries been the basic language of the natural sciences, and it has been studied for its own sake since ancient times. More recently, mathematics has found itself used more and more in the social sciences, and an understanding of the basics of calculus and statistics is fast becoming a requirement for proficiency in many of these disciplines. Quite apart from its importance to so many fields, the study of mathematics has its own rewards as accomplishment in the subject, even at a relatively elementary level, requires and promotes clarity of thought and clarity of expression.

A major in mathematics may be seen as the first step toward obtaining a graduate degree in one of the mathematical sciences, or it may constitute preparation for a professional degree program in a field such as education, medicine, law, or business. It also opens the door to a whole range of employment opportunities, as the analytical skills that a student develops in pursuing a major in mathematics are greatly valued by potential employers. There are, for

example, excellent career prospects in actuarial work and in the rapidly growing areas of biomathematics and biostatistics (interpreting results of clinical trials), modeling (in industry, government, and finance) and cryptology (in banking, television, the Internet, and elsewhere).

Students may choose to major in mathematics in the bachelor of arts program or in the bachelor of science program. Students in either program complete an introductory year of calculus either by taking MATH 201 or MATH 202 during their first year, or by achieving a high score on the Advanced Placement Test of the College Entrance Examination Board.

The choice of degree program depends largely upon the student's mathematical objective and interest in fields other than mathematics. Students with a strong interest in a career in mathematics or science – and in particular, students planning to continue on to Ph.D. programs in the mathematical sciences – are strongly advised to take courses beyond the minimum requirements for the major. Since a maximum of 12 courses in any one department may be counted toward the bachelor of arts degree, such students may be best advised to enroll in the bachelor of science program. On the other hand, students with strong interests outside of science and mathematics probably will prefer the bachelor of arts program.

The **bachelor of arts major** in mathematics consists of eight mathematics courses beyond the introductory year of calculus, plus one additional course in a related field. Five of the mathematics courses are specified: MATH 211, MATH 213, MATH 280, MATH 308, and MATH 320. The three remaining mathematics courses must be mathematics electives at the 300 level. The "related" course may be a fourth mathematics course at the 300 level, or MATH 212, or MATH 216, or any course in which mathematics plays a significant role at a reasonable level of sophistication. Subject to the approval of the mathematics department chair, this course may be:

- almost any full-credit course in computer science at or above the 200 level, for example CSCI 203.
- a third science course (beyond the two required of all liberal arts students) in which college-level mathematics plays a major role. Included among the courses in this category are nearly all courses in physics at or above the 200 level.
- secondary school student teaching in mathematics.
- an appropriate course from the humanities, social sciences, or engineering.
- a Capstone course in which college-level mathematics or statistics plays a major role.

The **bachelor of science major** in mathematics requires 10 mathematics courses beyond the introductory year of calculus. Six of the 10 mathematics courses are specified: MATH 211, MATH 212, MATH 213, MATH 280, MATH 308, and MATH 320. The remaining four courses are mathematics electives at the 300 level. BS students also must take PHYS 211 and PHYS 212 (or PHYS 211E and PHYS 212E) and two additional laboratory science courses.

The additional laboratory science courses may be chosen from any discipline in the division of natural sciences or from computer science. Any course in physics beyond PHYS 212 may be chosen, excluding those used to meet the basic two-course physics requirement; any laboratory course in computer science at the level of CSCI 203 or beyond may be chosen.

The recommended sequence for the bachelor of science major is as follows:

First Year	**First Semester**: MATH 201; PHYS 211 **Second Semester:** MATH 202; PHYS 212
Sophomore Year	**First Semester:** MATH 211; MATH 213 or MATH 280, Laboratory science **Second Semester:** MATH 212; MATH 213 or MATH 280; Laboratory science
Junior Year	**First Semester:** MATH 308 or MATH 320; Elective in mathematics **Second Semester:** MATH 308 or MATH 320; Elective in mathematics
Senior Year	**First Semester:** Elective in mathematics **Second Semester:** Elective in mathematics

Prospective secondary school teachers (grades 7 – 12) must complete either the bachelor of arts or the bachelor of science degree with a major in mathematics. Students seeking teacher certification should confer as early as possible with the mathematics and education departments to devise a program of study, which normally will include all requirements for certification in the Commonwealth of Pennsylvania. For this certification, students must include MATH 303 and MATH 335 among their mathematics electives within the mathematics major; additional mathematics requirements include MATH 207, MATH 240, and either MATH 216 or MATH 307. Required courses in education include EDUC 101, EDUC 201, EDUC 240, EDUC 359 (student teaching), EDUC 459, and either EDUC 334 or EDUC 335. Also required is a course in English literature, which must be in addition to the basic W1 course.

Students majoring in mathematics with a special interest in pure mathematics or statistics can earn formal concentration in these areas by selecting their 300-level electives appropriately and taking one additional course. In particular, those intending to pursue graduate study in mathematics or statistics should plan to complete the relevant concentration.

The pure mathematics concentration consists of MATH 309, MATH 345, MATH 346, and two of the following: MATH 311, MATH 333, MATH 362. The statistics concentration consists of MATH 303, MATH 304, MATH 305, MATH 307, and either MATH 309 or MATH 345. Students majoring in mathematics with a special interest in computer science are encouraged to consider minoring in computer science.

Students who, by the end of their junior year, have completed MATH 308 and MATH 320 and a total of at least three mathematics courses at the 300 level, and who have achieved a grade point average of at least 3.50 both in their mathematics courses and overall are encouraged to apply for departmental honors. If an appropriate mathematics department faculty adviser is available and the student is eligible under the above criteria, then the student can work for departmental honors. To achieve departmental honors, he or she completes at least two half-credit semesters of independent study in mathematics (MATH 391), writes an honors thesis under the adviser's direction, and satisfies all other requirements as put forth by the University Honors Council.

A **minor** in mathematics consists of either four credits from mathematics courses numbered 211 or above, at least one of them at the 300 level; or of three credits from courses in mathematics numbered 211 or above, at least two of them at the 300 level. All credits must come from courses taken at Bucknell University.

The minor can be specified as mathematics (statistics), if at least two of the required credits are from among the courses MATH 217, MATH 303, MATH 304, MATH 305, and MATH 307.

The minor can be specified as mathematics (applied/modeling mathematics) if at least two of the required credits are from among the courses MATH 212, MATH 222, MATH 226, MATH 343, MATH 350, and MATH 358.

111. Mathematics from a Humanist Perspective (II; 3, 0)
Provides the nonspecialist with an appreciation for what mathematics is and what mathematicians do.

117. Introduction to Mathematical Thought (II; 3, 1.5)
An investigation of number, numeration, and operations from the perspective of elementary school teachers and pupils. Open only to B.S. elementary education or early childhood students. Required fieldwork.

118. Elementary Geometry and Statistics (II; 3, 0)
Investigation of geometric, probablistic, and statistical concepts related to elementary school mathematics and how children learn and make sense of these concepts. Prerequisite: MATH 117 or permission of the instructor.

192. Topics in Calculus (II; 3, 0)
Elementary calculus and applications taken primarily from economics. Topics include algebraic, exponential, and logarithmic functions of one and several variables, graphs, limits, derivatives, and integration. Not open to students who have taken MATH 201 or MATH 205.

201. Calculus I (I and II; 4, 0)
An introduction to the calculus of algebraic, trigonometric, and transcendental functions. Interpretation, significance, and calculations of a derivative. Applications to geometry, biology, physics, economics, and other subjects. Introduction to the definite integral, including the Fundamental Theorem of Calculus. Not open to students who have taken MATH 192 or MATH 205.

202. Calculus II (I and II; 4, 0)
Methods of integration including substitution, integration by parts, numerical approximations, and improper integrals. Series, including Taylor series. Complex numbers, polar coordinates, differential equations, and applications. Prerequisite: MATH 201 or MATH 205. Not open to students who have taken MATH 206.

205. Accelerated Calculus I (I; 4, 0)
For students intending to complete Calculus I and II in one semester, this course covers the material of MATH 201 during the first half of the semester. (Students normally complete MATH 206 during the second half of the semester.) Prerequisite: Placement or permission of the instructor. Not open to students who have taken MATH 201 or MATH 192.

206. Accelerated Calculus II (I; 4, 0)
Covers the material of MATH 202 in the second half of the semester. Prerequisite: completion of MATH 205 during the first half of the same semester.

207. The Teaching of Mathematics in Secondary Schools (II; 3, 0)
Investigation into the components of effective secondary school mathematics instruction, including lesson design/implementation (curriculum, tasks, discourse, and assessment). Required fieldwork. Prerequisite: EDUC 201 or permission of the instructor.

209. Mathematical Problem Solving (I; 1-5, 0) Half course.
Mathematical problem solving, with an emphasis on problems and topics that appear in contests such as the Putnam Competition. Prerequisite: permission of the instructor.

211. Calculus III (I and II; 3, 0)
Calculus of vector-valued functions and functions of several variables. Applications, including local, absolute, and constrained extrema. Multiple integrals and applications. Line integrals and surface integrals. Prerequisite: MATH 202.

212. Differential Equations (I and II; 3, 0)
Basic methods of solving ordinary differential equations. Systems of linear differential equations, Laplace transform, applications and selected topics. Prerequisite: MATH 211. Not open to students who have taken MATH 222.

213. Elementary Linear Algebra (I and II; 3, 0)
Linear equations, matrices, vector spaces, linear transformations, determinants, eigenvalues. Prerequisite: MATH 202 or 206.

216. Statistics I (I and II; 3, 1)
Exploratory data analysis, sampling distributions, regression, sampling designs, confidence intervals, hypothesis testing, ANOVA. Statistical software is used and applications, including projects, are undertaken. Not open to students who have taken MATH 226, MGMT 242, or PSYC 215.

217. Statistics II (I; 3, 1)
Exploratory data analysis, design of experiments and inference emphasizing applications in biology and environmental science. Includes multiple linear regression, analysis of variance, categorical data analysis, nonparametric statistics. Prerequisite: MATH 216 or equivalent.

222. Differential Equations for Engineers (II; 3, 0) Half course.
First order differential equations, second order linear equations, higher order linear equations, numerical approximations. Prerequisite: MATH 211. Open only to civil engineering and computer science engineering students. Not open to students who have taken MATH 212.

226. Probability and Statistics for Engineers (I; 3, 0) Half course.
Descriptive modeling and statistics, sampling and experimental design, discrete and continuous random variables, central limit theorem, and elementary inference. Prerequisite: MATH 202 or 206. Open only to engineering students and students in computer science. Not open to students who have taken MATH 216.

240. Combinatorics and Graph Theory for Secondary Mathematics (II; 3, 0) Half course.
Combinatorics (permutations, combinations) and graph theory (Eulerian paths, trees, directed graphs). Does not count toward the mathematics major. Students will join a section of MATH 241 mid-semester. Prerequisite: MATH 280. Open only to students seeking certification in secondary mathematics who have not taken MATH 241.

241. Discrete Structures (II; 3, 0)
Sets, logic, and relations, mathematical induction, functions, combinatorics, graph theory. Does not count toward the mathematics major. Prerequisite: MATH 202.

280. Logic, Sets, and Proofs (I and II; 3, 0)
Logic, sets; proof techniques; relations, functions, sequences and convergence; cardinality. Skills and tools for independent reading, problem solving, and exploration. Corequisite: MATH 211 or MATH 213.

291. Undergraduate Readings (I or II; R; 2-8, 0) Half to two courses.
Readings and research in special topics at an intermediate level. Prerequisite: permission of the instructor, adviser and department chair.

303. Probability (I and II; 3, 0)
Elementary probability, random variables, moments, central limit theorem, conditional expectation, statistical distributions derived from the normal distribution. Probability simulations and applications from various fields. Prerequisite: MATH 211.

304. Mathematical Statistics (II; 3, 0)
Point and interval estimation, hypothesis testing, theory of least squares and its relation to the design and analysis of experiments. Prerequisites: MATH 216 or equivalent and MATH 303 or permission of the instructor.

305. Statistical Modeling (I; 3, 0)
Regression and analysis of (co)variance. Model diagnosis and remediation. Generalized linear models and nonlinear regression. Multicollinearity and ridge regression. Use of advanced statistical software. Prerequisites: MATH 216 or equivalent, and either MATH 213 or MATH 303 or permission of the instructor.

307. Statistical Design of Scientific Studies (II; 3, 0)
Sampling, design of experiments and observational studies. Includes completely randomized, block, factorial, and nested designs. Simple random stratified, systematic, and cluster sampling. Estimation procedures and sample size calculations. Prerequisite: MATH 217 or MATH 303.

308. Introduction to Real Analysis I (I and II; 3, 0)
Real numbers and elementary topology of Cartesian spaces, convergence, continuity, differentiation and history of the development of analysis. Prerequisites: MATH 211, MATH 213 and MATH 280.

309. Introduction to Real Analysis II (AI or II; 3, 0)
Continuation of MATH 308. Integration theory and advanced topics in analysis. Prerequisite: MATH 308.

311. Theory of Numbers (AI or II; 3, 0)
Classical number theory in an algebraic setting. Topics include unique factorization, diophantine equations, and linear and quadratic congruences. Advanced topics from algebraic or analytic number theory. Prerequisites: MATH 213 and MATH 280, or permission of the instructor.

319. Topics in Advanced Mathematics (I or II; R; 3, 0)
Special topics, to be selected from algebra, analysis, geometry, statistics, etc.

320. Introduction to Algebra (I and II; 3, 0)
Groups and rings; homomorphisms and isomorphism theorems; history of the development of algebra. Additional selected topics. Prerequisites: MATH 213 and MATH 280.

333. Topology (AI or II; 3, 0)
Topological spaces, connectedness, compactness, continuity, separation, and countability axioms. Metric, product, function, and uniform spaces. Prerequisites: MATH 211 and MATH 280, or permission of the instructor.

335. Geometry (I; 3, 0)
Historical and axiomatic foundations of geometry. Euclidean and non-Euclidean geometries. Prerequisite: MATH 280 or permission of the instructor.

343. Numerical Analysis (I; 3, 2)
Floating point arithmetic, development of computational algorithms and error estimates for root approximation, interpolation and approximation by polynomials, numerical differentiation and integration, cubic splines, least-squares, linear systems; lab component. Prerequisites: MATH 211 and CSCI 203, or permission of the instructor.

345. Linear Algebra (AI or II; 3, 0)
Systems of linear equations, determinants, vector spaces, canonical forms for linear transformations and matrices, bilinear forms, inner product spaces, applications to such other areas as geometry, differential equations, linear programming. Prerequisites: MATH 213 and either MATH 280 or permission of the instructor.

346. Modern Algebra (AI or II; 3, 0)
Advanced topics in algebra including group theory, field theory, Galois theory. Prerequisite: MATH 320.

350. Methods in Applied Mathematics (AI or II; 3, 0)
Techniques drawn from partial differential equations, transform methods, Fourier and complex analysis, and variational calculus. Prerequisite: MATH 212 or MATH 222 or permission of the instructor.

358. Topics in Operations Research (AI or II; 3, 0)
Mathematical and statistical techniques in operations research. Queueing theory. Additional topics may include simulation, forecasting, non-linear programming, inventory models. Methods and applications drawn from various fields. Prerequisite: MATH 303 or permission of the instructor.

362. Introduction to Complex Analysis (AI or II; 3, 0)
Limits, analytic functions, integrals including contour integrals. Cauchy's Integral Theorem, entire functions and singularities. Prerequisites: MATH 211 and MATH 280 , or permission of the instructor.

378. Seminar (I or II; R; 2, 0) Half course.
Informal seminars in various topics as the need arises. Topics may deal with algebra, analysis, topology, differential equations, statistics. Prerequisite: permission of the instructor.

391 and 392. Reading and Research (I or II; R; 2-8, 0) Half to two courses.
Reading and research in various topics for qualified undergraduates or graduate students. Prerequisite: permission of the instructor, adviser, and department chair.

Military Science (MILS)

Director: LTC Robert Oreskovic

Assistant Directors: CPT Christopher T. Griffiths, CPT Stephen Johnson

Instructor: MSG James Durham

Technicians: Barbara Carl, Richard Everetts

Reserve Officer Training Corps (ROTC), or Military Science education is a four-year program designed to prepare college students for Army service as commissioned officers in the active Army, or part-time in the Army Reserve or Army National Guard. The program is available to qualified Bucknell University, Bloomsburg University, Susquehanna University, Penn College of Technology, and Lycoming College students.

Scholarship first-year students and non-scholarship first- and second-year students may enroll on a trial basis with no commitment to the military. Students may leave the program or continue with advanced courses to earn a commission as an officer upon graduation.

Although the program is designed to start with new first-year students each fall, it is possible to enter the program as late as fall of the junior year. Students with prior military service or those who complete a 28-day summer training camp may bypass the first-year and sophomore level training.

Various types and lengths of scholarships are available, some of which guarantee duty in the Army Reserve or Army National Guard.

Scholarship Cadets receive: FULL tuition, a subsistence allowance of up to $500 a month, and a book allowance of $900 a year. Bucknell University will pay room and board charges for scholarship cadets who are living on campus.

Non-scholarship Cadets receive a subsistence allowance of up to $500 a month.

Non-scholarship and some types of scholarship cadets also may become part of Army Reserve or Army National Guard units while in ROTC to receive additional benefits.

Program requirements include a 33-day summer training course between the junior and senior years. Opportunities exist for other specialized summer training such as Airborne School, Air Assault School, Internships with Active Duty Army units, or Internships with Federal government agencies.

The time commitment for first- and second-year Cadets during the school year is approximately five hours a week. For third and fourth year Cadets the time commitment is approximately 10 hours a week. Time is spent on weekly classes, physical training, monthly leadership labs, and a once-a-semester field training exercise.

Courses in Military Science do not carry credit toward the academic courses required for a degree. However, in the College of Engineering, credit for one elective course may be granted upon request for satisfactory completion of the advanced course.

For more information, contact the ROTC department at 570-577-1013.

101. Foundation of Officership (I; 2, 1)
Acquaints student with ROTC program. Increases self-confidence through team study. Learn fundamental concepts of professional leadership in both classroom and outdoor laboratory environments.

102. Basic Leadership (II; 2, 1)
Learn/apply principles of effective leading. Develop communication skills to improve individual performance and group interaction. Relate organizational ethical values to the effectiveness of a leader.

201. Individual Leadership Studies (I; 2, 1)
Learn/apply ethics-based leadership skills. Develop skills in oral presentation, writing concisely, planning of events and coordination of group efforts. Learn fundamentals of ROTC's Leadership Development Program.

202. Leadership and Teamwork (II; 2, 1)
Focuses on leading a small group of individuals. Examines the role of the leader, military leadership concept, personal character, decision making, implementing decisions, motivation, supervision, and training.

301. Adaptive Team Leadership (I; 3, 1)
Series of practical opportunities to lead groups, receive personal assessments and lead again in situations of increasing complexity. Plan and conduct training for younger students to teach and develop leadership skills.

302. Leadership Under Fire (II; 3, 1)
Analyze tasks; prepare written or oral guidance for students to accomplish tasks. Delegate tasks and supervise. Plan for and adapt to the unexpected in organizations under stress.

401. Developing Adaptive Leaders (I; 3, 1)
Plan, conduct and evaluate activities of the ROTC cadet organization. Articulate goals, put plans into action to attain them. Develop confidence in skills to lead people and manage resources.

402. Leadership in a Complex World (II; 3, 1)
Continues the methodology from MILS 401. Identify and resolve ethical dilemmas. Refine counseling and motivating techniques. Prepare for a future as a successful Army lieutenant.

**The students who enroll in the Reserve Officer Training Corps (ROTC) are governed by the policies promulgated by the Department of Defense, which policies regarding sexual orientation are in contravention of Bucknell University's nondiscrimination policy.*

Music (MUSC)

Professors: William E. Duckworth, Barry T. Hannigan, William E. Kenny, William A. Payn, Lois Svard (Chair)

Associate Professors: Christopher Para, Catherine F. Payn, Annie J. Randall

Music at Bucknell University covers a wide range of artistic activities and intellectual pursuits. These vary from performing in traditional groups, such as the concert band, chapel choir, chorale, opera company, and symphony orchestra, or non-Western groups,

such as the Indonesian Gamelan orchestra, to the systematic preparation for a career in music, whether in the classroom, in arts management, or on the concert stage.

Within the Music Department, a dedicated faculty of active performers, composers, and scholars contribute to an enthusiastic atmosphere of music making and academic learning. And the wide variety of musical ensembles and organizations on campus provide numerous opportunities for solo and group performance in which students from all disciplines are invited and encouraged to participate.

The University offers two different degrees in music. All music majors at Bucknell, whether in the Bachelor of Arts or the Bachelor of Music degree, study a common curriculum of music history, music theory, and performance. Beyond that, the Bachelor of Arts music major is a general program of study within the liberal arts designed to equip students with a broad background in music, while allowing them time to pursue studies in other areas of the University. The Bachelor of Music degree is a more highly specialized program of study in which students have more time to pursue music. It is assumed that people in this degree program plan to become professional musicians of some sort, and individualized professional programs in performance, composition, music history, and music education are offered.

The Bucknell Department of Music maintains its own music library of scores and CDs, houses the Cook Collection of Musical Instruments, and offers some 60 to 70 concerts a year that present both students and professional musicians.

Bucknell University's music department is accredited by the National Association of Schools of Music.

BACHELOR OF MUSIC

A candidate for the degree of Bachelor of Music may choose from four specified curricula: the curriculum in performance, in composition, in music history, or in music education. An audition is required for admission to all Bachelor of Music degree programs, including history and composition. Recordings are not accepted. Applicants for the degree in composition additionally must submit a portfolio of their work. The Music Department website contains complete, up-to-date information about the audition process, dates of auditions, and scholarships.

A Bucknell student who wishes to change his or her degree program from a Bachelor of Arts in music to a Bachelor of Music may apply for admission to the Bachelor of Music program at the end of each semester through the sophomore year. The application must be made in writing to the chair of the music department, must include a jury examination or audition, must include a music-education interview as applicable, and must be approved by the full music faculty. Students normally are not accepted into the Bachelor of Music degree program after the completion of their sophomore year.

All Bachelor of Music students must pass a functional keyboard requirement, which includes improvisation, harmonization, and transposition. This requirement is fulfilled by taking MUSC 152 as an audit. The course must be finished in four semesters, and is designed so that even a beginning keyboard player can finish within the time limit. Failure to do so will prevent a student from continuing in the degree program. Students, such as piano majors, who already have keyboard skills, must still pass the requirements of the

course, but can do so in an accelerated manner in consultation with the instructor. Students must continue to register for the course each semester until it is completed successfully.

All Bachelor of Music students at Bucknell University must participate in an official music department ensemble each semester they are in residence. The only normal exception to this policy is the semester in which music education students undertake practice teaching. Students also must perform in a chamber-music setting on at least two occasions. These experiences are arranged through consultation with a student's applied music instructor. Note that music majors audit ensembles rather than take them for credit because the credits do not count toward fulfilling the minimum degree requirements.

Performance

Candidates in performance are reviewed at the end of each semester through an examination by a jury composed of members of the faculty of the Department of Music. Candidates whose progress is determined to be insufficient will not be permitted to continue in the Bachelor of Music degree program. Performance majors are expected to appear in several successful performances prior to presenting a full public recital in the senior year.

Voice majors in the Bachelor of Music-performance curriculum are required to demonstrate basic proficiency in at least two foreign languages (French, German, or Italian). Students coming to the University having taken at least the equivalent of one college semester (one year in secondary school) in one of the three specified languages should take a minimum of one semester in each of the other two. Students arriving with the specified background in two of the languages should undertake a minimum of one semester in the third. Students without the required experience in any of the three languages must take a minimum of one semester in two of the three languages. Students having had the required minimum in all three have no further language requirement. Students who choose to pursue a minor in Spanish at Bucknell may petition to have that coursework replace one of the other required languages.

Note that music majors audit ensembles rather than take them for credit because the credits do not count toward fulfilling the minimum degree requirements.

The following is a brief outline of required courses of study. Detailed information on this program will be supplied by the Department of Music. Course credit distribution is as shown:

Courses other than Music: Common Learning Agenda courses and electives	13
Courses in Music: MUSC 101, 102, 201, 202, 204, 205, 206, 259, 262*, 304*, plus four music electives, one of which must be a course in non-Western music.	13
Courses in Solo Performance (Private Lessons): (4 semesters at .50 credit per semester and 4 at 1 credit)	6
Total Number of Credits:	32

*Half-credit courses

Composition

This curriculum permits a concentration in the compositional aspects of music in addition to promoting sound musicianship and a broadly based background in the liberal arts. Candidates in composition are reviewed each semester to determine sufficient progress within the degree. Candidates whose progress is determined to be insufficient will not be permitted to continue in the Bachelor of Music program.

During the senior year a student must present a minimum of a half recital of original compositions (30 minutes) in partial fulfillment of the graduation requirements for this curriculum. Additionally, the student must be enrolled in a composition class during the semester that this senior recital is given.

Note that music majors audit ensembles rather than take them for credit because the credits do not count toward fulfilling the minimum degree requirements.

Thirty-two full academic course credits are required for graduation, distributed as follows:

Courses other than Music: Common Learning Agenda courses and electives	13
Courses in Music: MUSC 101, 102, 201, 202, 204, 205, 206, 209, 210, 259, 262*, 304*, 350 (studies in composition), plus three music electives, one of which must be a course in non-Western music.	15
Courses in Solo Performance (Private Lessons): (8 semesters at .50 credit per semester)	4
Total number of credits:	32

*Half-credit courses.

Music History

The curriculum in music history cultivates critical thinking and writing, instills sound musicianship, develops expertise in the area of music history and literature, and fosters a broadly based background in the liberal arts. Candidates in music history are reviewed each semester to determine sufficient progress within the degree. Candidates whose progress is determined to be insufficient will not be permitted to continue in the Bachelor of Music program.

During the senior year, a student has the option of presenting half a solo recital or undertaking a special research project in a historical aspect of music.

Note that music majors audit ensembles rather than take them for credit because the credits do not count toward fulfilling the minimum degree requirements.

Thirty-two full academic course credits are required for graduation, distributed as follows:

Courses other than Music: Common Learning Agenda courses and electives.	13
Courses in Music: MUSC 101, 102, 201, 202, 204, 205, 206, 259, 262*, 304*, 362, a course in non-Western music, plus four music electives including at least three additional courses in the area of music history.	15

Courses in Solo Performance (Private Lessons): (8 semesters at .50 credit per semester)	4
Total Number of Credits:	32

In addition to the above, students in the music history program also must fulfill a foreign language requirement by one of the following: 1) students entering the University having the equivalent of two years of high school study in one foreign language and one year of high school study in a second foreign language will have met the requirement, or 2) students entering the University having the equivalent of two years of high school instruction in a single foreign language also must have a minimum of one semester of instruction in a second language. Additional instruction in languages is strongly encouraged.

*Half-credit courses

Music Education

The curriculum in music education prepares students to teach music in the public schools. The curriculum is approved by the Department of Education of Pennsylvania as a requirement for professional certification. Through this course of study a student will be expected to develop (1) sound musicianship in an applied area, (2) knowledge of music theory and the history of music, and (3) broad cultural awareness through courses other than music. Students may choose a curriculum that reflects either a vocal or instrumental emphasis. Candidates in music education are reviewed each semester to determine sufficient progress within the degree. Candidates whose progress is determined to be insufficient will not be permitted to continue in the Bachelor of Music program.

The student will be expected to make several successful appearances in recital before the senior year, and to present during the fall of the senior year a minimum of half a solo recital in a chosen applied area. The student will undergo jury examinations in the major instrument according to the published schedule. Additionally, all Music Education majors will take four semesters of lessons in a secondary instrument: those students whose primary performance area is instrumental will study a secondary instrument, voice students will study piano, and piano students will study voice.

Note that music majors audit ensembles rather than take them for credit because the credits do not count toward fulfilling the minimum degree requirements.

Music Education students are expected to create an e-portfolio and to pass the required PRAXIS tests. Thirty-two full academic course credits are required for graduation, distributed as outlined below (As of August 2007, the Pennsylvania Department of Education Chapter 49 revisions are to be incorporated into all education programs which include additional requirements in Special Education and English Language Learning. At the time of this printing, those revisions have not yet been incorporated into the curriculum, so the following is subject to change):

Courses other than Music: Common Learning Agenda and state-required courses (NOTE: Capstone requirement fulfilled by EDUC 409/439)	9

Courses in Music and Music Education: MUSC 101, 102, 115*, 116*, 117*, 119*, 201, 202, 204, 205, 206, 235, 236, 250 or 251, 259, 269, plus one credit in world music; EDUC 101, EDUC 201, EDUC 439 (Practice Teaching, fulfills Capstone); and four quarter credits of additional studio instruction in secondary instruments.	21
Courses in Solo Performance (Private Lessons): (6 semesters at .25 credit per semester and 1 semester at .50 credit per semester)	2
Total number of credits:	32

*Half-credit courses.

BACHELOR OF ARTS WITH A MAJOR IN MUSIC

The bachelor of arts degree with a major in music is designed to produce a competent, broadly trained musician capable of professional activity or of graduate study. Entrance to the major in music is based upon a demonstration of sufficient musical talent and training to pursue a study of music. An audition is required for entrance to the degree program. See the Music Department website for information on the audition process, dates of auditions, and scholarships.

The major in music consists of nine courses distributed as follows:

- Theory of Music (MUSC 101, 102, 201, 202)
- History of Music (MUSC 204, 205, 206)
- Two additional courses chosen from advanced theory, history, and solo performance, or any additional music course approved by the adviser. (A minimum of four semesters of private lessons at .25 credit per semester is required. A maximum of 1.5 course credits of such lessons may be counted toward the nine music courses required for the major in music.)

Students with a strong interest in music who are undecided as to a major should select MUSC 101 in the first semester; this will facilitate later scheduling if a music major is declared.

Bachelor of arts majors in music are expected to participate in one or more of the vocal or instrumental performing organizations of the music department for at least six semesters and to attend recitals and other musical events.

The Minor in Music

The minor in music consists of a minimum of five course credits in music plus one course credit of applied music (instruction in performance). Of the six credits required, a minimum of two credits must be above the 100 level. The minor should be structured as follows:

- Two courses in the theory area, chosen from MUSC 105 or 101 (not both), MUSC 102, 201, and 202.
- Two course credits in music history. At least one must be chosen from MUSC 204, 205, or 206. The second course should be chosen from MUSC 203, 205, 206, or other 200- or

300-level course in music history such as MUSC 222, 223, 224, 225, 226, 229, 261, 264, 267, or 362.

- One course credit in elective(s) in music (not ensemble credits).
- One course credit of solo performance (normally four semesters at one-quarter credit per semester).
- As with the music major, credits received from participation in ensembles will not count toward the minimum requirements for the minor.

Regulations

Deviation from the established program of study for the major in music may be granted only by permission of the faculty adviser, the department chair, and the dean of the College of Arts and Sciences.

Non-music majors are charged an additional fee for lessons as noted in the section on fees.

Private instruction is offered in the following areas of performance: voice, piano, violin, viola, violoncello, organ, harpsichord, woodwind, brass, guitar, and percussion instruments.

Students may receive academic credit for participation in music department ensembles, such as band, orchestra, chorale, chapel choir, opera, and gamelan. An audition is required for each of these ensembles. Non-music majors may receive one-quarter credit for participation in each recognized ensemble with a maximum of one-half credit permitted per semester and a limit of two full course credits in all. Note that music majors and minors audit rather than take them for credit because the credits do not count toward fulfilling the minimum degree requirements.

The department schedules and administers jury examinations for students in the various music degree programs. Jury requirements may vary for the different programs; all music majors should contact the department to obtain the published schedule.

100. Introduction to Music (I or II; 3, 0)
Appreciation through understanding the materials of music, forms, historic styles, and aesthetic principles. Emphasis upon aural recognition of representative compositions. No prior musical knowledge required. Not open to music majors.

101. Music Theory I (I; 3, 2)
Examination of the factors controlling musical style (melody, harmony, form, etc.). Includes sight singing, ear training, creative writing, and analysis.

102. Music Theory II (II; 3, 2)
Harmonic structure in homophonic and polyphonic music, through seventh chords and tonality changes. Includes sight singing, dictation, and keyboard harmony. Prerequisite: MUSC 101.

103. Jazz, Rock, and the Avant-Garde (II; 3, 0)
American music since 1900, from Cage to Basie to Elvis. Parallel lines of development traced. Does not count toward minimum degree requirements for music majors.

105. Introduction to Music Theory (I or II; 3, 0)
Studies in basic musicianship including elementary harmony, form, analysis, and some creative writing. Designed for non-majors seeking an understanding of musical structure. Not open to students who have taken MUSC 101.

111. Popular Music in the USA (I or II; 3, 0)
Historical survey of popular music in the United States beginning with blackface minstrelsy and ending with hip hop. Open to all students.

112. Jazz History and Its Classic Recordings (I; 3, 0)
The history of jazz emphasizing the actual recordings and film footage of its most important artists, from Scott Joplin through Anthony Braxton and beyond.

113. Ellington, Coltrane and Jarrett – Who's Next? (II; 3, 0)
The course will examine the music and influence of these innovators and will attempt to identify the next wave of jazz giants.

115. String Class (AII; 3, 0) Half course.
Intended for music-education majors. A beginning course in stringed instruments.

116. Voice Class (AI; 3, 0) Half course.
Vocal technique foundation course for music-education majors. Non-majors who wish to enroll in the course must obtain the permission of the instructor.

117. Woodwind Class (AI; 3, 0) Half course.
Intended for music-education majors. An introductory course in wind instruments.

119. Brass and Percussion Class (AII; 3, 0) Half course.
Intended for music education majors. An introductory course in brass and percussion instruments.

136. Music for Classroom Teachers (I; 3, 0)
This course will cover music fundamentals for the classroom teacher; notation, classroom instruments, singing and the child's voice, and keyboard skills, along with materials and instructional strategies to incorporate music into the elementary classroom. Prerequisite: EDUC 101.

152. Functional Keyboard (I and II; R; 0, 3) No credit course.
Addresses the acquisition of functional keyboard skills, including harmonization, transposition, and improvisation. Bachelor of Music requirement. Open to Bachelor of Music majors only. Prerequisite: permission of the instructor.

201. Music Theory III (I; 3, 1)
Secondary seventh chords; chromatic alteration and modulations in four-part harmony; melodic and harmonic dictation, keyboard harmony, and sight singing. Prerequisite: MUSC 102.

202. Music Theory IV (II; 3, 1)
Course objective: a thorough knowledge of written and aural 20th-century compositional techniques. Class requires advanced knowledge of the Sibelius notation program. Prerequisite: MUSC 201.

204. History and Literature of Music (I; 3, 0)
Introduction to the study of music history through stylistic developments in music of the Romantic through the Contemporary periods. Composers, masterworks, and musical style.

205. History and Literature of Music (I; 3, 0)
The history of music and development of musical forms and styles during the Medieval and Renaissance periods. Composers and masterworks.

206. History and Literature of Music (II; 3, 0)
Historical developments in music and musical style during the Baroque and Classic periods. Composers and masterworks.

209 and 210. Composition I and II (I and II; R; 2, 0)
Analytical and creative study of contemporary musical composition. Prerequisite: permission of the instructor.

234. Technology for Music Educators (I or II; 0, 3)
Explores technology and its uses in music pedagogy in classroom and performance settings. Prerequisite: open to Bachelor of Music major; others by permission.

235. Principles of Teaching Music (I; 3, 0)
Administration and development of the curriculum and individual course content for the public school music program, kindergarten through high school.

236. Problems of Music Teaching (II; 3, 0)
A seminar for music-education students concerned with problem solving and practical solutions to difficulties encountered in practice teaching. Corequisite: EDUC 439.

250. Instrumental Methods and Literature (I; 3, 2)
Orchestral, concert, marching, and jazz band repertoire. Elementary and secondary school methods and materials. Program administration. Prerequisite: permission of the instructor.

251. Choral Methods and Literature (II; 3, 2)
Elementary- and secondary-school choral methods and materials. Program pedagogy and administration. Prerequisite: permission of the instructor.

259. Conducting (I or II; 3, 0)
Standard beat patterns, basic conducting problems, analysis of instrumental and choral scores. Prerequisite: MUSC 201

260. Ensemble (I and II; R, 0, 3) Quarter course.
Students that are not music majors may receive one-quarter credit for participation in each ensemble, with a maximum of one-half credit per semester and a limit of two full course credits in all. Note that music majors audit ensembles rather than take them for credit because the credits do not count toward fulfilling the minimum degree requirements. All ensembles require an audition or permission of the instructor for first-time members. Ensemble sections are as follows:

260-01	Symphonic Band
260-02	Orchestra
260-03	Chorale
260-04	Chapel Choir
260-05	Opera Company

260-06 Handbell Choir
260-07 Jazz Band
260-08 Gamelan

261. Music of Asia (AII; 3, 0)
A multicultural approach to the diversity of folk and art music across the largest continent. Music of China, Southeast Asia, Indonesia, India, and Japan. Crosslisted as EAST 261.

262. Orchestration (AI; 2, 0) Half course.
Arrangements for instrumental groups in schools where instrumentation may be very limited; also for full orchestra and concert band. Prerequisite: MUSC 202.

265. Music in American Life: Selected Topics (I; 3, 0)
A music and culture course open to non-majors. Topics include music of colonial-era settlers, Native Americans, the Harlem Renaissance, "girl groups", and performance art.

267. Topics in Music History (AII; R; 3, 0)
The life and works of a single composer. Possible composers include Josquin, Bach, Handel, Haydn, Mozart, Brahms, Ives, Stravinsky, and Bartok.

269. Advanced Conducting (II; 3, 0)
Advanced baton technique, rehearsal methods, and score analysis. Prerequisite: MUSC 259 or permission of the instructor.

304. Style Analysis (I; 2, 0) Half course.
Detailed study of style and structure in music from simple cantilena forms and established structures to highly organized contemporary compositions. Emphasis upon analytical techniques. Prerequisite: MUSC 201.

350. Studies in Music (I or II; R) Half or full course.
Special projects to be undertaken on the approval of a faculty member and the department chair. Prerequisite: permission of the instructor.

362. Advanced Topics in Musicology (AI; 3, 0)
Notation problems, bibliography, and research method in music. Work with facsimiles of tablatures, plainsong, motets, and other medieval music genres. Prerequisites: two courses in music or the permission of the instructor.

Courses offered occasionally: 104 Introduction to Jazz, 106 Jazz Improvisation, 107 Class Piano for Non-music Majors, 108 Introduction to Choral Music, 109 Introduction to the Symphony, 111 Popular Music in America, 120 20/20: 20 New Sounds of the 20th Century, 211 Computer Music Composition, 215 Philosophy of Music, 221 Seminar: Early Music, 222 Seminar: Baroque Music, 223 Seminar: Classic Era, 224 Seminar: Romantic Music, 225 Seminar: 20th-century Music, 229 Opera and Ideas, 237 Piano Pedagogy, 238 Diction, 242 Keyboard Literature, 243 Chamber Music, 244 Chamber Music, 264 World Music

Neuroscience (NEUR)

Coordinating Committee: David W. Evans (Director), Owen Floody, Kathleen Page, DeeAnn Reeder, Eric Tillman

Affiliated Faculty: Elizabeth Capaldi, Mitch Chernin, Don Dearborn, Andrea Halpern, Peter Judge, Arthur Shapiro, T. Joel Wade

The program in neuroscience offers students an interdisciplinary major representing aspects of biology, psychology, animal behavior, chemistry, mathematics, bioengineering, and physics. The neuroscience major is intended to give students opportunities, through coursework and research experience, to study the nervous system, its development and influence on behavior (broadly defined). Our faculty are active and productive scholars who involve students in their research program, and thus we view research experience as a key aspect to the learning process.

The neuroscience major offers the degree of bachelor of science. All students are strongly encouraged to participate in research with faculty, as volunteers in their laboratories, or through independent studies and honors theses. Faculty interests and facilities include cell and molecular wet labs, electroencephalography for studying brain activity and cognitive/affective and perceptual processes, animal behavior labs for studying behavior and development in vertebrates (we house four species of primates, as well as rats and hamsters), and invertebrates (e.g., honey bees). We also have facilities for studying vision, music perception, and hormones and behavior. Students who succeed in neuroscience will be well-equipped to go on to graduate study in neuroscience, biology, psychology, and medicine, as well as to work in a variety of other disciplines including fields relating to biotechnology, pharmaceuticals, or medical instrumentation.

The **bachelor of science major** in neuroscience requires 12 basic courses, plus four advanced courses that the students can choose from an assemblage of courses. Three additional courses are recommended, but are not required for the completion of the degree program.

Of the 16 total courses taken by neuroscience majors, the following 12 courses are required: BIOL 205 Cell & Molecular Biology, BIOL 207 Genetics, CHEM 211 Organic Chemistry I, CHEM 212 Organic Chemistry II, CHEM 201 General Chemistry I or CHEM 221 Inorganic Chemistry I, CHEM 202 General Chemistry II or CHEM 231 Analytical Chemistry I, MATH 201 Calculus I or MATH 205 Accelerated Calculus; MATH 216 Statistics I or PSYC 215 Psychological Statistics, NEUR 100 Introduction to Neuroscience, PSYC 250 Physiological Psychology, BIOL/PSYC 343 Neural Plasticity or BIOL 303 Behavioral Neuroendocrinology or BIOL/ANBE 342 Neuroethology or BIOL 324 Neurophysiology, PSYC 203 Learning or PSYC 204 Human Cognition or PSYC 252 Sensation & Perception or PSYC 248 Developmental Psychobiology.

Courses recommended but not required are: BIOL 327 Molecular Biology, MATH 202 Calculus II, PHYS 211 Classical and Modern Physics I, PHYS 212 Classical and Modern Physics II

Further, students must choose four additional courses from the following list of courses. Students are encouraged to become involved with research such as independent studies. Only one undergraduate research credit can be counted toward the required courses for the major, however.

Track 1: General Neuroscience: Students seeking general exposure to neuroscience, or with equal interests in behavioral and cognitive and cellular and molecular neuroscience can select their advanced courses from the entire set of 24 courses in either Group 1, Group 2, Group 3.

Track 2: Behavior and Cognitive Neuroscience: If students have a specific interest in behavioral and cognitive perspectives (including developmental psychobiology) within the study of neuroscience, we would recommend that the student choose advanced courses from the behavioral side of the course offerings, as indicated as Group 2.

Track 3: Cellular and Molecular Neuroscience: For students with particular interests in cellular or molecular perspectives on nervous system structure and function, they may select courses focusing on those aspects of neuroscience by choosing course offerings listed in Group 3.

Group 1: ANBE 391, BIOL 318, BIOL 322, BIOL 348, BIOL 399, BMEG 300, BMEG 409 or BMEG 410, CHEM 375 or CHEM 376, PSYC 324, PSYC 329

Group 2: BIOL 303, BIOL 342, PSYC 305, PSYC 318, PSYC 349, PSYC 352

Group 3: BIOL 324, BIOL 327, BIOL 331, BIOL 339, BIOL 340, BIOL 352, BMEG 441, CHEM 351

The recommended sequence for the bachelor of science major is as follows:

First Year	**First semester:** BIOL 205, MATH 201, CHEM 201 or CHEM 211 **Second semester:** NEUR 100, MATH 216/PSYC 215, CHEM 202 or CHEM 212
Second Year	**First semester:** BIOL 207, PSYC 203 or PSYC 204 or PSYC 252 or PSYC 248, CHEM 211 or 221 **Second semester:** CHEM 212 or 231, PSYC 250 and PSYC 290
Third Year	**First semester:** BIOL/PSYC 303 or BIOL 324 or BIOL/ANBE 342 or BIOL/PSYC 343, NEUR elective, PHYS 211 (opt) **Second semester:** NEUR elective, PHYS 212 (opt)
Fourth Year	**First semester:** NEUR elective **Second semester:** NEUR elective

100. Introduction to Neuroscience (I or II; 3, 0)
A survey of the study of the nervous system and its structure and function, ranging from molecular analyses of neurons to electrical and other correlates of human cognition.

248. Developmental Psychobiology (I or II; 3, 0)
Addresses development in humans from conception through adolescence with some comparative analysis with non-humans. Emphasis on both normal and atypical processes of development, especially neuropsychological and neurobiological development. Prerequisite: PSYC 100 or NEUR 100.

305. Developmental Psychopathology(I or II; 3, 0)
Readings and discussion address the behavioral phenotypes (cognitive, social, linguistic) of a variety of neurodevelopmental and neuropsychiatric disorders in childhood in the context of theories and process of typical development. Basic genetic and neurobiological underpinnings of neurodevelopmental and neuropsychiatric disorders also are discussed. Prerequisites: NEUR 248 or PSYC 210 and PSYC 207. Crosslisted as PSYC 305.

360. Honor Thesis (I or II; R)
Honor thesis. Prerequisite: permission of the instructor.

399. Undergraduate Research (I or II; R; 0; 6-12) Half to two courses.
Research topics may be posed by students or faculty. Prerequisite: permission of the instructor.

Nontraditional Study (NTST)

Recognizing that there may be meaningful educational endeavors outside of the scheduled course or conventional independent study (which usually emphasizes library, laboratory, or field work), individual nontraditional study projects may be proposed. While such projects may be related to work experiences or internships, whether on or off campus, the student also must propose goals and procedures, and ultimately produce materials for faculty evaluation, which give evidence of significant learning and advancement in an academic discipline at Bucknell University (and thus justify degree credit).

Nontraditional study projects may be arranged with any instructor; they must be approved by the department or program chair and by the academic dean. Approved projects are normally for 1.0 course credit; it is possible to propose 2.0, 3.0, or 4.0 credits. Projects are numbered according to level as follows: elementary (1NT), intermediate (2NT), and advanced (3NT). The means of evaluation must be determined before the project is begun; grading may be either conventional (A-F) or pass-fail.

The Nontraditional Study program and the University Course program include a quarter-credit option for non-paid internships. The course designated for the partial credit is UNIV 1NT (see page 236 for course description). The UNIV 1NT program recognizes that the University has a strong interest in and commitment to facilitating more opportunities for students in the liberal arts interested in exploring opportunities in a variety of fields. Such internships round out formal academic experiences, particularly when completed within a structure that emphasizes self-reflection.

The number of UNIV 1NT opportunities is limited to two per student or one-half credit toward the degree. Students may complete additional UNIV 1NT experiences and have those recorded on the transcript, but those additional experiences will not earn degree credit. Students may earn only pass/fail grades for UNIV 1NT. Students may not receive UNIV 1NT credit for participation in an internship for which they receive financial remuneration.

Additional information and proposal forms are available in the dean's office of the College of Arts and Sciences.

Peace Studies Minor

Coordinator: Tansa G. Massoud

There are over 160 higher learning institutions offering peace studies programs in the United States and over 500 colleges around the world. The United States government gave official recognition to the field of peace studies in 1984 when it established the U.S. Institute of Peace. In 1987, the Peace Studies Association, a professional academic body, was established. In addition, the field is represented by the Consortium on Peace Research,

Education, and Development (COPRED). There are at least six scholarly journals devoted to peace studies.

Peace studies is an interdisciplinary field of study housed primarily in the social sciences. Other labels for peace studies include "peace and conflict studies", "peace and justice studies", and "conflict analysis and resolution." Peace studies explores the causes and nature of human conflict from the interpersonal to the global level. Historically, peace studies programs concentrated on "negative peace" or absence of war. Today, more attention is devoted to the concept of "positive peace" promoting social, political, and economic justice. A partial list of topics under peace studies includes violence, war, ethnic conflict, conflict management, conflict resolution, peace making, law, human rights, values, justice, environment, racism, sexism, and nonviolence. Normatively, the goal of peace studies is to promote a more just and peaceful world.

The peace studies minor selects courses related to this topic from a variety of departments and programs including anthropology, biology, East Asian studies, economics, English, environmental studies, geography, history, international relations, philosophy, political science, psychology, religion, sociology, and women's and gender studies.

The peace studies minor allows students to group a number of courses to advance their interest in conflict, violence, justice, and peace. A peace studies concentration will enrich students' understanding of their respective majors and prove useful to careers or graduate studies in a variety of fields, including journalism, education, media, politics, public policy, law, business, domestic and international organizations, and international relations.

The peace studies minor will consist of five courses, none of which can be double counted in the student's major and with no more than three of those five courses being in the same department.

1. Two of the five courses must be chosen from the list below:

PHIL 233	The Philosophy of Peace and Nonviolence
POLS 280	War
UNIV 219/POLS 281	Peace Studies

2. The remaining three courses must be selected from the list given below. However, students can propose to include another relevant course by consulting with and obtaining approval from the coordinator of the minor. Students also can manage to have an internship or field work related to the minor count for credit.

ANTH 235	Modern Africa
ANTH 246	Japanese Culture and Society
BIOL 266	Animal Behavior
CAPS 406	Hiroshima: Eros or Thanatos
EAST 234	China since 1800
EAST 246	Japanese Culture and Society
EAST 255	Modern Japanese History
ECON 235	African Economic Development
ECON 236	Unemployment and Poverty
ECON 258	Intermediate Political Economy
ECON 278	Asian Economic Development
ECON 317	Economic Integration in Western Europe
ECON 333	China and World Economy

ECON 340	Comparative Pacific Basin Economies
ENGL 221	African American Literature
ENGL 228	Topics in Gender Studies
ENST 205	Green Utopias
ENST 255	Environmental Justice
ENST 260	Environmental Law
GEOG 113	Human Impact on the Environment
GEOG 209	Economic Geography
GEOG 210	Urban Conditions
GEOG 211	Political Geography
GEOG 223	Gender and Geography
GEOG 236	Third World Development
HIST 220	American Civil War and Reconstruction
HIST 223	Twentieth-century African American History: Eyes on the Prize
HIST 239	Contemporary Europe
HIST 290	European Imperialism and Colonialism
HIST 292	African History II
HIST 311	U.S. History since 1865: Topics in the History of U.S. Foreign Relations
IREL 255	International Law
IREL 310	Human Rights
IREL 425	International Relations of Migration
LAMS 150	Latin America: An Introduction
LAMS 297	Latin American History
POLS 170	International Politics
POLS 205	Comparative Politics
POLS 211	Third World Politics
POLS 219	Latin American Politics
POLS 222	Russian Politics
POLS 224	Government and Politics of the Middle East
POLS 229	Women and Politics
POLS 271	American Foreign Policy
POLS 272	U.S. National Security Policy
POLS 275	Global Governance
POLS 285	International Relations of the Western Hemisphere
POLS 287	United States and the Middle East
POLS 289	Arab-Israeli Conflict
PSYC 209	Social Psychology
PSYC 231	Community Organizations in Northern Ireland
PSYC 233	Black Psychology
PSYC 306	Advanced Abnormal Psychology
PSYC 330	Sectarian Conflict in Northern Ireland
RELI 201	Islam
RELI 202	Hinduism
RELI 226	Environmental Ethics
RELI 234	Issues of Religion and Culture: Ethics of War and Peace
RELI 245	Religions of China
RELI 246	Religions of Japan

RELI 280	Religion and Constitutional Law
RELI 281	Religion and American Politics
SOCI 213	Race in Historical and Comparative Perspectives
SOCI 234	Criminology
SOCI 243	Race and Ethnicity
SOCI 251	Violence and Society
SOCI 409	How Holocausts Happen
SOCI 410	Remembering the Holocaust
WMST 150	Introduction to Women's and Gender Studies

Philosophy (PHIL)

Professors: Richard Fleming, Gary Steiner

Associate Professors: Peter S. Groff (Acting Chair), Jeffrey S. Turner

Assistant Professors: Gillian A. Barker, Sheila Lintott, Joshua W. Preiss (visiting)

Philosophy studies carefully the kinds of questions that are so perplexing that we can neither calmly ignore them nor easily answer them. It develops skills in interpreting texts, thoughtfully responding to other viewpoints, constructing and evaluating argumentation, and the disciplined imagining of novel possibilities for human knowing, valuing, and living.

The philosophy major at Bucknell University is designed to introduce students to several varieties of philosophical questions, styles, methods, and concerns, as well as to the central periods in the history of Western philosophy. The major provides a solid foundation for students choosing to pursue graduate work in philosophy. It also helps students to develop the kinds of critical thinking skills useful for careers in law, business, journalism, medicine, and so on.

The **major** in philosophy consists of a minimum of eight courses, which must include:

- As a first course: PHIL 98, or PHIL 100, or PHIL 103, or PHIL 201, or PHIL 220
- PHIL 103 or PHIL 201 (if not elected as the introductory course); PHIL 205 and PHIL 207; either PHIL 213 or PHIL 228
- Two 300-level seminars or one 300-level seminar plus PHIL 321 and PHIL 322, or PHIL 323
- At least one additional elective from the offerings in philosophy.

Philosophy majors interested in study abroad are encouraged by the department to do so, and may work with faculty in the department to find a program of study suitable to their interests. Qualified students also are encouraged to pursue honors study in philosophy; they should consult with their department advisers or with the chair of the department about honors work in philosophy. Students wishing to do graduate work in philosophy may want to supplement their philosophical studies with language courses, for example in ancient Greek, French, or German.

The **minor** in philosophy consists of four courses, two of which must be 200 level or above. While no particular combination of courses is required, the student may wish to design a minor on a specific topic. Some examples:

- *Values:* PHIL 100; PHIL 212; PHIL 213 or PHIL 228; PHIL 214, or PHIL 223/RELI 216

- *History of Philosophy*: PHIL 100; PHIL 205; PHIL 207; PHIL 256 or PHIL 258 or PHIL 260 or PHIL 222 or PHIL 259
- *Logic and Philosophy of Science*: PHIL 100 or PHIL 103; PHIL 201; PHIL 220; PHIL 207 or PHIL 224
- *Fields of Philosophy:* PHIL 100 or PHIL 103 or PHIL 223/RELI 216; PHIL 103 or PHIL PHIL 201; PHIL 212 or PHIL 220; PHIL 213 or PHIL 228
- *Nature of Knowledge:* PHIL 100 or PHIL 103; PHIL 205 or PHIL 207; PHIL 224 or PHIL 220; PHIL 222 or PHIL 260
- *Modern and Contemporary Philosophy:* PHIL 100, PHIL 103, or PHIL 220; PHIL 207 or PHIL 256; PHIL 214, PHIL 222, or PHIL 227; PHIL 258, PHIL 259, or PHIL 260
- *Mini-Major*: PHIL 103 orPHIL 201; PHIL 213 or PHIL 228; PHIL 205 or PHIL 207; PHIL 212
- *Philosophical Analysis:* PHIL 220 or PHIL 103; PHIL 222 or PHIL 227; PHIL 224; PHIL 228
- *Existentialism and Phenomenology:* PHIL 100 (Existentialism section); PHIL 256; PHIL 258; PHIL 260.

98. Myth, Reason, Faith (I or II; 4, 0)
This course is designed to introduce students to some of the most significant works in the Western intellectual tradition. Works by major writers from Homer to Dante will be studied. Crosslisted as CLAS 98, ENGL 98, and HUMN 98.

100. The Fields and Functions of Philosophy (I or II; R; 3, 0)
Fundamental philosophical questions (e.g., the nature of philosophy, reality, freedom, knowledge, art, and value) examined through reflection on original sources in the history of philosophy. The course is divided into relatively small sections; each instructor employs different materials.

103. Logic (I or II; 3, 0)
An introduction to informal and formal ways of reasoning. The structures and general forms of argument as well as the standards and criteria needed to evaluate arguments, and the historical development of logical reasoning, will be studied.

150. Art, Nature, and Knowledge (I or II; 4, 0)
An interdisciplinary study of selected works in art, music, literature, science, and philosophy from the Renaissance through the 19th century. Crosslisted as ENGL 150, HUMN 150, and RESC 150.

201. Symbolic Logic (I or II; 3, 0)
An investigation of the basic concepts and problems of modern logic. Areas studied will include propositional and quantificational logic, set theory, and metalogical theory (completeness and consistency). Prerequisite: PHIL 103 or permission of the instructor.

204. Scientific and Everyday Reasoning (I or II; 3, 0)
An investigation of inductive and ordinary language forms of reasoning. The basic concepts and problems in inductive reasoning will be studied, and attention given to how our ordinary language influences traditional logical principles and criteria. A careful examination of fallacies and mistakes in reasoning will introduce the more formal aspects of the course. Prerequisite: PHIL 103.

205. Greek Philosophy (I; 3, 0)
Philosophical thought from its explicit beginnings to the Hellenistic era. Research on important aspects of the thought of Plato and Aristotle. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

206. Medieval Philosophy (I or II; 3, 0)
A comparative examination of Jewish, Christian, and Islamic traditions in medieval philosophy, focusing on selected problems in metaphysics, epistemology, and ethics. Readings in Augustine, Anselm, Avicenna, Averroës, Saadia, Maimonides, Aquinas, Duns Scotus, and Ockham. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

207. Development of Modern Philosophy (II; 3, 0)
Philosophical thought in the classical modern age, including Continental Rationalism, British Empiricism, and Kant. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

212. Philosophy of Art (I or II; 3, 0)
Analysis of the creative process, the work of art, natural beauty, aesthetic experience, and principles of criticism. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220 or permission of the instructor. Crosslisted as ART 222.

213. Ethics (II; 3, 0)
An attempt to formulate adequate criteria for the basic moral conceptions of good and bad, right and wrong, and duty, by a study of leading ethical view points from Plato to the present. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

214. Social and Political Philosophy (II; 3, 0)
Problems such as individual and state, freedom and organization, power and rectitude, philosophy of law, equity and differences, the sociomoral basis of rights. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

215. Philosophy of Music (I or II; 3, 0)
An exploration of the concepts and problems involved in a philosophical (self-reflective) investigation of music. Using two 20th-century musicians (Bernstein and Cage) as a guide, questions about the being and characteristics of music will be pursued. Learning to talk and ask questions clearly about the nature of sound and silence is a goal of the course. (Philosophers such as Rousseau, Schopenhauer, Thoreau, Camus, and Wittgenstein will provide direction for class discussion and lectures.) Crosslisted as MUSC 215.

218. Ecology, Nature, and the Future (I or II; 3, 0)
Analysis of some philosophical conceptions of the self-nature relation and their implications for the use and abuse of our natural environment.

219. The Problem of False Consciousness (I or II; 3,0)
Examination of leading theories of individual and mass deception, as well as theories of self-deception, as these theories bear on the task of informed decision making. Philosophers to be studied may include: Freud, Marx, Sartre, Jung, Foucault, Lukacs, Habermas. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

220. Philosophy of Science (I or II; 3, 0)
An analysis of explanation and prediction, the ontological and epistemological status of theories, evaluation of theories, and scientific change.

222. Analytic Philosophy (I or II; 3, 0)
Introduction to the analytic movement by way of selected topics illustrating its subject matter, methods, and historical development. Readings include Ayer, Wittgenstein, Russell, Moore, Austin. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

223. Philosophy of Religion (I or II; 3, 0)
Problems for rational inquiry arising from the claims and practices of religious faith; the nature of religious experience and language, arguments for God's existence, evil. Crosslisted as RELI 216. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220 or RELI 125; or permission of the instructor.

224. Theory of Knowledge (I or II; 3, 0)
The concepts of knowing, perceiving, believing, and the rational reconstruction of knowledge. Contemporary and classical sources. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

225. Metaphysics (I or II; 3,0)
Inquiries about the nature of being and the structure of reality, and the epistemological and ethical status of such inquiries, as conducted by such thinkers as Plato, Descartes, Kant, Nietzsche, and Heidegger. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

226. Philosophy of Mind (I or II; 3, 0)
Examination of central issues in the philosophy of mind. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

227. Philosophy of Language (I or II; 3, 0)
An examination of philosophical problems concerning the nature of language, meaning, and communication, as dealt with by such contemporary philosophers as Wittgenstein, Austin, Cavell, Russell, Merleau-Ponty, and others. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

228. Contemporary Ethical Theory (I or II; 3, 0)
Contemporary approaches to the problems of ethics: universality, moral vs. non-moral judgments, facts and values, etc. Readings in such thinkers as Hare, Rawls, Gilligan, Williams, MacIntyre, Nussbaum, and Rorty. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

230. Feminism and Philosophy (I or II; 3, 0)
An examination of feminist philosophy primarily as it occurs in the U.S. from the late 18th century to the present. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220 or permission of the instructor.

233. The Philosophy of Peace and Nonviolence (I or II; 3, 0)
A course in peace studies that will investigate the arguments and spirit of Pacifism and nonviolent philosophies. Crosslisted as UNIV 233.

235. Philosophy of Mathematics (I or II; 3, 0)
Examination of some philosophical problems and contemporary views concerning mathematical concepts and methods: the nature of mathematical truths and mathematical proof; the concept of infinity; ontological status of numbers and classes; metamathematical

results. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220 or permission of the instructor.

250. Nihilism, Modernism, Uncertainty (I; 3, 0)
Presents major modern figures and concepts with examples from painting, music, literature, philosophy, and science. Prerequisites: PHIL 98 and PHIL 150. Crosslisted as ENGL 230, HUMN 250.

256. Nineteenth-century European Philosophy (I or II; 3, 0)
The development of philosophical ideas in 19th-century Europe, considered as a background for the understanding of ideas influential today. Philosophers to be studied may include: Hegel, Schelling, Schopenhauer, Comte, Mill, Bradley, Kierkegaard, Nietzsche, and others. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

258. Existentialism (I or II; 3, 0)
Analysis of selected texts of Kierkegaard, Dostoevsky, Camus, or Sartre. Special attention given to the relation of existentialism to problems of post-Cartesian thought. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

259. American Philosophy (I or II; 3, 0)
A critical and historical survey of distinctive American philosophies: pragmatism, realism, scientific philosophies. Readings include: Peirce, James, Dewey, Lewis, Whitehead, Quine. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

260. Phenomenology (I or II; 3, 0)
Analysis of selected texts of Husserl, Heidegger, or Merleau-Ponty. Some consideration of the interpretation of the history of philosophy offered by phenomenology. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

262. Contemporary Continental Philosophy (I or II; 3, 0)
A survey of some major currents and figures in 20th-century philosophy. Philosophers to be studied may include: Husserl, Heidegger, Sartre, Merleau-Ponty, Benjamin, Barthes, Foucault, Derrida, Levinas. Prerequisite: one course in philosophy or permission of the instructor.

265. Topics in Aesthetics (II; R; 3, 0)
An investigation of specific topics in aesthetics, e.g., The Beautiful and the Sublime; Philosophy and Comedy; The Aesthetics of Film. These topics may vary yearly. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220 or permission of the instructor.

266. Chinese Philosophy (I; 3, 0)
Major philosophical schools of the classical age, Buddhist philosophy, Neo-Confucianism. Crosslisted as EAST 266.

267. Islamic Philosophy (I or II; 3, 0)
A survey of major historical figures and movements in the Islamic philosophical tradition. Philosophers to be studied may include: al-Kindi, al-Farabi, al-Razi, the Pure Brethren of Basra, Avicenna, al-Ghazali, Ibn Tufayl, Averroes, Ibn Khaldun, Suhrawardi, and Mulla Sadra. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220.

269. Indian Philosophy (I or II; 3, 0)
Examination of Indian philosophical thought from its beginnings in the Vedas and Upanishads through the development of the major philosophical schools, focusing on a number of interrelated metaphysical, epistemological, hermeneutic, and ethical questions. Readings in the systems of Nyaya-Vaisesika, Samkhya-Yoga, and Mimamsa-Vedanta, as well as in Buddhism, Jainism and Carvaka. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220 or permission of the instructor.

272. Philosophy of Biology (I or II; 3, 0)
We will survey the central epistemological and metaphysical problems addressed in the 20th-century philosophy of biology. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220 or permission of the instructor.

275. Topics in Greek Philosophy (I or II; 3, 0)
An investigation of specific topics in Greek philosophy, e.g., Friendship and Love in Plato and Aristotle; Contemporary Interpretations of Aristotle's Ethics and Politics. Prerequisite: PHIL 205 or permission of the instructor.

309. Seminar in Historical Studies: Individual Philosophers (I or II; R; 3, 0)
Intensive study of the works of a single philosopher chosen from the ancient, medieval, modern, or contemporary period of the history of philosophy. In recent years: Plato, Aristotle, Heidegger, Kant, Nietzsche, Wittgenstein. Prerequisites: two courses in philosophy and permission of the instructor.

310. Seminar in Historical Studies: Historical Periods (I or II; R; 3, 0)
Study of a selected period in the history of ancient, medieval, modern, or contemporary philosophy. In recent years: Philosophy of Ordinary Language, Habermas and (Post) Modernity. Prerequisites: two courses in philosophy and permission of the instructor.

311. Seminar in Philosophical Problems (I or II; R; 3, 0)
A selected problem of philosophy as this occurs historically in the ancient, medieval, or modern periods, or in contemporary thought. In recent years: Nihilism; Form, Idea, Metaphor. Prerequisites: two courses in philosophy and permission of the instructor.

319 and 320. Individual Studies in Philosophy (I and II; R)
Open to advanced students who wish to pursue individual programs of study under the supervision of a professor, or of a committee of professors if the subject falls within two or more departments. May be conducted as a seminar for three or more students pursuing similar programs. Subjects may be chosen from any field of philosophy in consultation with the members of the department of philosophy.

321 and 322. Honors Thesis (I and II)
Substantial independent work on some problem or topic approved by the department of philosophy as honors work.

323. Senior Thesis (I or II)
Independent research on a philosophical issue, in consultation with staff members. The thesis should show integrative and creative abilities. Prerequisite: major in philosophy.

475. Capstone in Literature and Philosophy (I or II; 3, 0)
A Capstone course examining: relationships between narrative and ethics; truth and self-expression; the "ancient quarrel" between poetry and philosophy. Readings selected from Plato, Virgil, Dante, Nietzsche, Derrida, Kundera, and others. Prerequisite: one course in philosophy.

480. Western Perspectives on Animals (I or II; 3, 0)
Examines the conceptual and moral status of animals in our culture, as expressed in philosophy, religion, ethology (animal behavior), the law, and social policy. Prerequisite: one course in philosophy.

Physics and Astronomy

Professor: Thomas H. Solomon

Associate Professors: Jeffrey M. Bowen, Jack F. Gallimore, Sally Koutsoliotas, Edwin F. Ladd, Martin K. Ligare, David C. Schoepf (Chair), Benjamin P. Vollmayr-Lee, Katharina Vollmayr-Lee

Assistant Professors: Raymond Chastain (visiting), Kevin Marshall (visiting), Michele D. Thornley

Physics is the fundamental science of the natural world. The study of physics and astronomy leads to a deeper appreciation and awareness of the world around us. From the quantum mechanical behavior at the smallest scale to the workings of the cosmos at the largest scale, physics consists of a few general principles that explain a vast range of phenomena. Coursework in physics leads to an understanding of these phenomena and gives students experience in abstract mathematical modeling as well as experimental and computational techniques. As a means to enhance the physics curriculum, research opportunities in astronomy and physics also are available and strongly encouraged.

A physics major is an appropriate first step on the path to a career as a research scientist. Since physics is such a fundamental science it can be the basis for the understanding of principles that are relevant to a wide variety of fields. It provides preparation for graduate study in physics or in related fields such as astrophysics, biophysics, chemical physics, geophysics, or engineering. A fundamental understanding of nature has been a goal throughout history, and a study of physics can be the focus of a liberal education because of its connections with intellectual history and philosophy. A major in physics can be the platform for pursuing a wide variety of careers including medicine, law, business, and teaching.

Modern astronomy involves the application of physics toward understanding the workings of the universe. Students interested in an introductory survey are encouraged to enroll in ASTR 101 (Our Solar System) or ASTR 102 (Stars, Galaxies, and Beyond). Students interested in advanced undergraduate or postgraduate study are advised to complete the physics major, choosing elective courses in observational astrophysics (ASTR 201) and advanced astrophysics (ASTR/PHYS 301).

A major in physics may be pursued under the bachelor of arts or bachelor of science degree program, either of which can provide adequate preparation for graduate study. Students in

the bachelor of arts program who plan to attend graduate school in physics should consult with their advisers to select an appropriate set of electives.

The standard entry point for either degree program is the year-long introductory sequence PHYS 211-212. Students with a strong background or aptitude in mathematics and physics who express an interest will be considered for placement in the special section PHYS 211E-212E of the introductory course.

A **bachelor of arts major** in physics consists of PHYS 211 (or PHYS 211E), PHYS 212 (or PHYS 212E), PHYS 221, PHYS 222 (with prerequisite MATH 211), PHYS 310, and a minimum of three other 200- or 300- level physics courses, two of which must be at the 300-level. One of the 300-level courses must be chosen from PHYS 317, PHYS 331, PHYS 332, or PHYS 333. (The other courses may include ASTR 201, ASTR 301 and approved Capstones.)

A **bachelor of science major** in physics consist of PHYS 211 (or PHYS 211E), PHYS 212 (or PHYS 212E), PHYS 221, PHYS 222 (with prerequisite MATH 211), PHYS 235, PHYS 310, PHYS 331, PHYS 332, PHYS 333, and a minimum of two other 300-level physics credits. (These courses may include ASTR 301 and approved Capstones.) In addition, bachelor of science candidates must take MATH 212, MATH 213, and either ASTR 201 or a 200- or 300-level biology, chemistry, computer science, or geology course.

The typical course sequence for students pursuing the bachelor of science physics major might look like the following:

First Year:	**First Semester:** PHYS 211; MATH 201 **Second Semester:** PHYS 212; MATH 202
Sophomore Year:	**First Semester:** PHYS 221; MATH 211; MATH 213 **Second Semester:** PHYS 222; PHYS 235; MATH 212
Junior Year:	**First Semester:** PHYS 332; PHYS 333 **Second Semester:** PHYS 310; Elective(s) in physics
Senior Year:	**First Semester:** PHYS 331; PHYS 317; Elective in science **Second Semester:** Elective(s) in physics

A physics major leading to the bachelor of arts degree also is available in combination with a bachelor of science in engineering in a five-year program.

A **minor** in physics consists of four 200- or 300-level physics courses, which may include ASTR 201. Advanced placement credit does not count toward the minor.

The physics department encourages students to participate in research projects; research serves as an important complement to the classroom study of physics and astronomy. The department offers research opportunities in atomic and molecular physics, chaos and nonlinear dynamics, astronomy and astrophysics, general relativity, theoretical quantum optics, laser spectroscopy, elementary particle physics, positron physics, biological physics, theoretical condensed matter physics, and statistical physics.

Honors in physics is given to those students who are accepted by the University Honors Council and successfully complete and defend an honors thesis in physics.

Study abroad is possible for students completing either a bachelor of arts or bachelor of science degree. Such study should be discussed well in advance with the academic adviser and the chair of the physics department.

Students wishing to become certified as secondary school physics teachers should consult with the education department and the chair of the physics department to arrange a plan of study that ensures that all of the requirements for certification will be met.

Astronomy (ASTR)

101. Our Solar System (I; 3, 3)
An introduction to astronomy concentrating on our evolving understanding of the solar system. Designed for non-science majors.

102. Stars and Galaxies.(II; 3, 3)
An introduction to astronomy concentrating on the structure of our universe beyond the solar system. Designed for non-science majors. ASTR 101 is not a prerequisite for ASTR 102.

201. Observational Astrophysics (AII; 2, 2)
This course covers spherical astronomy and observational techniques, and applications of physics toward solar system objects, stars, stellar evolution, galaxies, and cosmology. Some night observing required. Laboratories focus on observational techniques and data reduction. Prerequisite: PHYS 212 (or PHYS 212E) or PHYS 221.

301. Astrophysics (AII; 3, 0)
An introduction to general astrophysics covering mechanics of orbiting bodies, radiation laws, stellar spectra, stellar atmospheres, the internal constitution of stars, stellar energy, galaxies, and cosmology. Prerequisites: PHYS 222 and MATH 212. Crosslisted as PHYS 301.

337. Contemporary Problems in Astronomy/Astrophysics (I and II; R) Half or full course.
Seminar or independent study in areas of interest in the astronomy/astrophysics community. Prerequisite: permission of the instructor.

350. Undergraduate Research (I and II; R) Half or full course.
Prerequisite: permission of the instructor.

401. Astrophysics (I or II; 3, 0)
An introduction to astrophysics, including orbiting bodies, stellar structure and energy production, galaxies, and cosmology. We also will examine cultural pressures on the flow of scientific progress. Prerequisites: PHYS 222 and MATH 212. Crosslisted as PHYS 401.

Physics (PHYS)

141. Secrets of the Universe (I; 3, 3)
The great ideas of 20th-century physics (symmetry principles, relativity, and quantum mechanics) and their application to cosmology and the evolution of the universe. Also, historical development and philosophical implications of these ideas. Designed for non-science majors. No prerequisite. Not open to students who have passed a 200-level physics course.

142. Light and Vision (AII; 3, 3)
Particle and wave theories of light, cameras and optical instruments, the visual process, lasers, and optical communications. Designed for non-science majors. No prerequisite. Not open to students who have passed a 200-level physics course.

144. How Things Work (II; 3, 3)
This course introduces the ideas of physics in the context of everyday phenomena, including common inventions and topics in medicine, sports, and music. Designed for non-science majors. No prerequisite. Not open to students who have passed a 200-level physics course.

145. Contemporary Issues in Energy (AII; 3, 3)
This course will examine the physics of energy use, energy generation, and energy transformations. Each offering of the course will have a unifying theme such as the environment, weaponry, or alternative energy sources. Designed for non-science majors. Not open to students who have successfully completed a 200-level physics course.

211 and 212. Classical and Modern Physics (I and II; 4, 3)
Newtonian mechanics, relativity, waves, thermodynamics, quantum mechanics, electricity and magnetism, and special topics in modern physics. PHYS 211 or permission of the instructor is prerequisite to PHYS 212. Corequisites: MATH 201 for PHYS 211; MATH 202 or another mathematics course for PHYS 212.

211E and 212E. Classical and Modern Physics (I and II; 4, 3)
Same topics as PHYS 211-212 with more emphasis on mathematical modeling, computer applications, and extensions of the theory. Fourth hour to be used for guest speakers, computer lab time, testing, and other problem solving. This course is intended for students with a strong background in mathematics and physics. PHYS 211E or permission of the instructor is prerequisite to PHYS 212E. Corequisites: MATH 201 for PHYS 211E; MATH 202 or another mathematics course for PHYS 212E.

221. Classical Mechanics (I; 3, 3)
Newtonian mechanics including conservation laws, rotational dynamics, forced damped harmonic motion, and coupled oscillations. Prerequisites: PHYS 211 (or PHYS 211E) and MATH 202 or advanced placement with corequisite MATH 205.

222. Wave Mechanics and Quantum Physics (II; 4, 0)
Physics of coupled oscillations and waves, including classical wave equation. Wave-particle duality; origin and elementary applications of quantum mechanics; the Schroedinger wave equation; atomic and nuclear physics. Prerequisites: PHYS 212 (or PHYS 212E) or PHYS 221 and MATH 211.

235. Applied Electronics (II; 2, 4)
Circuit fundamentals, linear and digital integrated circuits, transducers, analog to digital conversion, filtering, Fourier methods, microcomputers, and computer interfacing. Designed for science and computer science majors. Prerequisite: PHYS 212 (or PHYS 212E). Open to electrical engineering students by permission only.

301. Astrophysics (AII; 3, 0)
An introduction to general astrophysics covering mechanics of orbiting bodies, radiation laws, stellar spectra, stellar atmospheres, the internal constitution of stars, stellar energy, galaxies, and cosmology. Prerequisites: PHYS 222 and MATH 212. Crosslisted as ASTR 301.

303. Modern Optics (AII; 3, 0)
Geometrical optics, interference and diffraction, quantum optics, optical properties of matter, lasers and holography. Prerequisite: PHYS 222 or permission of the instructor.

309. Condensed Matter Physics (AII; 3, 0)
Crystal structure, phonons, free electron theory of metals, band theory, semi-conductors, magnetism, superconductivity and superfluidity, liquid crystals, and other special topics. Prerequisite: PHYS 222 or permission of the instructor.

310. Experimental Physics (II; 2, 4)
Methods and techniques used in experimental and computational physics, including data analysis and numerical methods, use of standard research equipment, and documentation of laboratory work emphasizing written and oral communication of scientific results. Experiments include topics in astrophysics, atomic and nuclear physics, nonlinear dynamics, optics, and phase transitions. Prerequisite: PHYS 222 or permission of the instructor.

317. Thermodynamics and Statistical Mechanics (I; 3, 0)
The laws of thermodynamics, thermodynamic functions, kinetic theory of gases, statistical mechanics. Prerequisites: PHYS 212 (or PHYS 212E) and PHYS 221 or PHYS 222 or permission of the instructor.

329 and 330. Experimental Physics I and II (I and II; 0, 6) Half course.
Experiments and computer simulations based on principles of optics, solid-state physics, nuclear physics, nonlinear dynamics, biophysics, electricity and magnetism, laser spectroscopy, electronics, phase transitions, and vacuum systems. Prerequisite: PHYS 222 or permission of the instructor.

331. Advanced Classical Mechanics (I; 3, 0)
Kinematics and dynamics of particles, systems, and rigid bodies. Hamilton's principles, Lagrange's equations, theory of small vibrations, orbital mechanics accelerated frames, and nonlinear dynamics. Prerequisites: PHYS 221 and MATH 212 or permission of the instructor.

332. Quantum Mechanics (I; 3, 0)
Basic postulates and applications, perturbation theory, angular momentum, scattering theory, relativistic effects. Prerequisites: PHYS 221, PHYS 222 and MATH 211 or permission of the instructor.

333. Electromagnetic Theory I (I; 3, 0)
Classical electromagnetic theory, including scaler and vector potentials, electrostatics, magnetostatics, time dependent fields, and culminating with Maxwell's equations. Prerequisites: PHYS 212 (or PHYS 212E) and MATH 211.

334. Electromagnetic Theory II (AII; 3, 0)
Continuation of PHYS 333. Electromagnetic waves, radiation theory, theory of relativity, and elements of plasma physics. Prerequisite: PHYS 333.

336. Mathematical Physics (AII; 3, 0)
Topics will include two or three of the following: complex variables, special functions, tensor analysis, group theory, partial differential equations. Prerequisites: PHYS 212 (or PHYS 212E), MATH 212, and MATH 213.

337. Contemporary Problems in Physics (I and II; R) Half or full course.
Seminar or independent study in areas of current interest in the physics community. Prerequisite: permission of the department.

339. Advanced Quantum Mechanics and Particle Physics (AII; 3, 0)
Advanced topics in quantum mechanics including applications to elementary particle physics. Prerequisite: PHYS 332.

350. Undergraduate Research (I or II; R) Half or full course.
Prerequisite: permission of the department.

401. Astrophysics (I or II; 3, 0)
An introduction to astrophysics, including orbiting bodies, stellar structure and energy production, galaxies, and cosmology. We also will examine cultural pressures on the flow of scientific progress. Prerequisites: PHYS 222 and MATH 212. Crosslisted as ASTR 401.

Political Science (POLS)

Professor: Gregory S. Sanjian

Associate Professors: Michael R. James, Tansa G. Massoud, Amy R. McCready, Andrea Stevenson Sanjian (Chair)

Assistant Professors: John Doces, John A. Grommel (visiting), Richard Hecock, Robin D. Jacobson, Scott R. Meinke, David M. Mitchell

Political science is the systematic study of all aspects of collective decision making in human society. This includes questions of right and wrong, law, power, and justice. Political scientists deal with politics in the United States (American politics and policy), other societies around the world (comparative politics), global issues (international politics), and questions of political fairness (political theory).

For undergraduates, the study of political science, like other programs for the bachelor of arts degree, is intended to contribute to the acquisition of skills and knowledge that form the foundation of a liberal arts education. The study of political science may provide background for careers in law, journalism, government service, international organizations, teaching, or business.

A **major** in political science consists of a minimum of eight courses. A core of four courses is required to provide a grounding in the traditional subfields of the discipline: American Politics (POLS 140); International Politics (POLS 170); Comparative Politics (POLS 205); and Political Theory (POLS 210). In addition, at least one of the eight courses must be a seminar at the 300 level or a political science Capstone.

Upon declaration of a major in political science, students consult with the chair to determine assignment of an appropriate faculty adviser. Students and their adviser then prepare a prospectus for fulfilling major requirements. Individual interests and special capabilities of the student, as well as the scope of the discipline, are considered in preparing the prospectus. Courses initially proposed in the prospectus may be revised upon approval of the adviser.

In planning their academic program, students intending to major in political science are encouraged to complete the core courses as early as practicable. Normally majors will have completed the subfield core course before electing other 200-level courses within the same subfield, and a core course may be prerequisite for some courses. In choosing a 300- or 400-level course to fulfill the major requirements, students must have had at least the core

course in the subfield. For seminars, permission of the instructor is required at the time of registration. Capstone courses carrying political science credits also may be counted toward the major and the seminar requirement.

Subfield coursework is distributed as follows:

• American Politics: POLS 140, POLS 230-249, POLS 330-339, POLS 370-379

• Comparative Politics: POLS 205, POLS 211-229, POLS 300-309, POLS 350-359

• International Politics: POLS 170, POLS 270-289, POLS 320-329, POLS 380-389

• Political Theory: POLS 210, POLS 250-269, POLS 310-319, POLS 360-369

• General and Cross-subfield: POLS 290-299, POLS 390-399

Political science majors are encouraged to study off-campus. No more than two course credits earned off-campus from non-Bucknell staff may be used to meet the major requirements. Students planning to undertake off-campus or nontraditional study are expected to consult closely with their adviser. Transfer students should consult with the department chair to determine how prior coursework will be evaluated to meet major requirements. Courses in other departments crosslisted with political science in the annual *Class Schedule* may be used toward the major requirement on consultation with the student's adviser.

Qualified seniors are invited to pursue honors in political science by writing and defending an honors thesis. Interested juniors should consult with their adviser, with the department chair, or with another member of the department. Interested students also may pursue independent study (POLS 395 or POLS 396) under a plan worked out with a member of the department.

The department encourages students to take related courses in other disciplines to complement and strengthen the political science major. Recommendations may be obtained from the adviser. Questions concerning the major are to be directed to the department chair.

Five **minors** are available in political science:

- American Politics: five courses in political science, including POLS 140 and at least two courses drawn from the American Politics subfield (see above)
- Comparative Politics: five courses in political science, including POLS 205 and at least two courses drawn from the Comparative Politics subfield (see above)
- International Politics: five courses in political science, including POLS 170 and at least two courses drawn from the International Politics subfield (see above)
- Political Theory: five courses in political science, including POLS 210 and at least two courses drawn from the Political Theory subfield (see above)
- General: five courses in political science, including one course from each of the four subfields (see above).

Open-topic courses (POLS 290, POLS 390) may be counted toward a minor where the topics are appropriate. Off-campus and nontraditional courses in political science may be used as one of the non-specified courses in a minor.

Core Courses (Required for Major)

140. American Politics (I and II; 3, 0)
A critical examination of the principles, structures, and processes that shape American politics. An emphasis on political behavior and institutions with application to contemporary political issues.

170. International Politics (I and II; 3, 0)
Introduction to major dynamics of international politics; the international system, decision making, perceptions, cooperation, conflict, and policy instruments, such as diplomacy and war. Analysis is linked to specific international events and issues.

205. Comparative Politics (I and II; 3, 0)
Politics and policy outside the United States; concepts for the comparison of political systems. Democracy, Third World politics, revolution, political stability and change, international effects on political processes.

210. Political Theory (I and II; 3, 0)
Examination of the moral dimensions of politics. Authors include Plato, Aristotle, Milton, Hobbes, Locke, Rousseau, and Marx. Major concepts include justice, freedom, rights, and authority.

Comparative

211. Third World Politics (I or II; 3, 0)
Politics in Latin America, Africa, and Asia. The Third World in the modern world system. Politics and economic development. Instability, militarism, and democracy.

219. Latin American Politics (II; 3, 0)
The dynamics of politics in Latin American social, economic, and cultural context, with use of general comparative concepts of politics.

222. Russian Politics (I; 3, 0)
The politics of transition in Russia, from authoritarianism toward democracy with a market economy.

223. European Politics (AII; 3, 0)
Comparative analysis of institutions and policy-making in European political systems, including the European Union.

224. Government and Politics of the Middle East (I or II; 3, 0)
This course provides the student with an understanding of the internal political process of the area. Topics include political institutions/groups, the state, culture, Islam, and revolution.

229. Women and Politics (AII; 3, 0)
An analysis of women and politics generally with specific focus on feminism and its relationship to political discourse and political action.

American

231. Introduction to Public Policy (I; 3, 0)
Course introduces students to theories of the policy-making process in America, and also provides an overview of the major policy areas in American politics.

232. American Public Policy Analysis (II; 3, 0)
Learn to conduct policy analysis through in-depth exploration of policy issues such as health care, criminal justice, immigration, and art policy. Specific topics will vary.

234. State and Local Internship Program (II; 3; 0)
Participants explore politics and policy at the state and local level through integrated class work, independent research, and real world work experiences.

237. American Political Parties (AI; 3, 0)
Analysis of American political parties in terms of democratic, organizational, electoral and governmental functions.

240. The American Congress (I or II; 3, 0)
Examination and evaluation of representative government in America. Detailed investigation of the U.S. House of Representatives and Senate.

241. Constitutional Law: Civil Rights (I or II; 3, 0)
An introduction to civil rights under the 13th, 14th, and 15th Amendments, focusing on discrimination based on race, sex, sexual orientation, class and alien status.

242. Civil Liberties and the Constitution (I or II; 3, 0)
Examination of civil liberties policy in the U.S. through a study of U.S. Supreme Court decisions.

243. The American Presidency (I; 3, 0)
Origins and development of the presidency and an analysis of the sources and nature of executive power in American national government.

244. American Judicial Politics (II; 3, 0)
Survey of the process and substance of policymaking in the Federal court system, with an emphasis on Supreme Court decision making and the policy impact of court decisions.

246. Race and American Politics (I or II; 3, 0)
Looks at the connections between race and power through various forms of political behavior including electoral, policymaking, and citizen participation. Explores the mutually constitutive relationship between politics and race.

249. Power, Protest, and Political Change (AI; 3, 0)
Explores the life cycle of social movements. Looks at mobilization, tactic selection, and the legacies of "passionate politics" through specific cases of social movement activity. Crosslisted as SOCI 269.

332. Public Opinion (I; 3, 0)
Structure and origins of public opinion, public opinion polling, political psychology, and implications for democracy.

Political Theory

254. Sex and Social Order (I or II; 3, 0)
Analysis of connections between sex and social structure to determine how our understanding of sexuality is implicated in our political system, economy, and cultural ideology.

256. Topics in Social and Political Ethics (I or II; R; 3, 0)
Study of the types of argument and analysis used in social and political ethics, in part through an examination of contemporary social issues.

260. Topics in Legal Thought (I or II; R; 3; 0)
Subjects will vary, e.g., morality and the legal process; religion and law; contemporary jurisprudence.

261. Twentieth-Century American Legal Thought (I or II; 3, 0)
Analysis of dominant and critical trends through the century including legal realism, liberalism, law and morality, feminist legal theory, law and economics, and critical race theory.

263. Race and Ethnicity in American Legal Thought (II; 3, 0)
An examination of legal theories on race and ethnicity, including race-based citizenship, affirmative action, school desegregation, busing, voting rights, racial gerrymandering, tribal sovereignty, and immigration.

266. Nationalism East and West (I or II; 3, 0)
Examination of the theory and practice of nationalist movements in Europe, the United States, India, and the Middle East.

268. Contemporary Democratic Theory (I or II; 3, 0)
Analysis of the moral foundations of democracy and the institutional means for achieving it, including voting systems, political parties, alternative representation, and workplace democracy.

International

271. American Foreign Policy (I; 3, 0)
Analysis of American foreign policy institutions and decision-making processes; examination of the history and of current issues and problems of U.S. foreign policy.

272. U.S. National Security Policy (II; 3, 0)
The evolution of U.S. national security policy since World War II. Topics include defense in the nuclear area, strategic doctrine, arms control, budgeting, WMDs, policy making.

273. The Atlantic Alliance (I; 3, 0)
This course concerns North Atlantic political and security relations and uses the NATO alliance as its vehicle. The course examines binding and dividing intra-alliance issues during and after the Cold War.

274. Race, Nation-state and International Relations (II; 3, 0)
The course examines the processes by which states as expressions of social relations that are embedded in political institutions have been used by social forces, nationally, and transnationally, to racialize nations, societies, and global politics. Crosslisted as HIST 260 and IREL 245.

275. Global Governance (I or II; 3, 0)
This course explores the rationales, processes, and institutions of multilateral governance in a globalized world. We examine the U.N., nongovernmental organizations, conflict resolution, economic development, environment, human rights, and international law. Not open to first-year students. Crosslisted as IREL 275.

277. International Political Economy (I or II; 3, 0)
This course examines the politics of international economic relations including trade, finance, and development.

278. International Law (II; 3, 0)
The nature, historical development, and sources of international law; substantive and procedural international law and its role in international relations. Crosslisted as IREL 255.

280. War (I; 3, 0)
This course focuses on the causes of wars. Theories from many disciplines are examined in relation to interstate and civil or internal wars. Applying these theories to different wars, through the use of case studies, will comprise a large part of the course.

281. Peace Studies (AI or II; 3, 0)
This course provides an introduction to the field of peace studies. A number of topics are examined including pacifism, conflict resolution techniques and approaches, and finally actual case studies to illustrate peacemaking in two contexts: interstate wars and internal or civil strife. Crosslisted as UNIV 219.

284. International Relations of Europe (II; 3, 0)
This course will examine the foreign policies of European countries, individually and collectively through the European Union, toward each other, regional and global intergovernmental organizations, and other regions/countries. Crosslisted as IREL 218.

286. International Relations of the Caribbean (I; 3, 0)
Study of the domestic and external sources of foreign policy and of foreign policy issues of Caribbean states, including regional integration and U.S.-Caribbean relations. Crosslisted as IREL 230.

287. United States and the Middle East (AII; 3, 0)
This course examines U.S. foreign policy towards the Middle East. The focus is on the economic, security, and political interests of the United States in the region.

288. French Foreign Policy Since 1945 (I or II; 3, 0)
Analysis of French foreign policy, institutions, and decision-making processes in the Fourth and Fifth Republics. Current issues and problems of French foreign policy. Prerequisite: Bucknell *en France* students only.

289. The Arab-Israeli Conflict (AI or II; 3, 0)
This course examines the roots and transformation of the conflict, role of outside actors, and how it can be resolved.

Seminars

350. Seminar in Comparative Politics (I or II; R; 3, 0)
Selected topics. Prerequisite: POLS 205 or permission of the instructor.

360. Seminar in Political Theory (I or II; R; 3, 0)
Selected topics. Prerequisite: POLS 210 or permission of the instructor.

370. Seminar in American Politics (I or II; R; 3, 0)
Selected topics. Prerequisite: POLS 140 or permission of the instructor.

380. Seminar in International Politics (I or II; R; 3, 0)
Selected topics. Prerequisite: POLS 170 or permission of the instructor.

General and Cross-Subfield

290. Topics in Politics (I or II; R; 3, 0)
Attention will focus on specific thinkers, problems, concepts, or issues of recurring and continuing significance in political analysis. Topics will vary.

295. Internship (I or II; 3, 0)
Reserved for nontraditional study.

390. Advanced Topics in Politics (I or II; R; 3, 0)
Advanced study of concerns not addressed in standing courses. Topics will vary. Prerequisite: permission of the instructor.

391. Research Methods in Political Science (AII; 3, 0)
This course is a survey of the various research methods used by political scientists. Students will critically analyze different approaches to research and construct original research designs for topics of their choice.

395 and 396. Independent Study (I and II; R, 3, 0)
Open to qualified students who wish to pursue individual programs of advanced study in political science. Prerequisite: approval of a proposal submitted to the department, normally at least two weeks prior to registration.

397. Honors Thesis (I and II; R; 3, 0)
Independent research on some topic approved as honors work by the department and Honors Council. Prerequisite: permission of the instructor.

Courses offered occasionally: 250 History of Western Political Thought I: Ancient and Medieval, 251 History of Western Political Thought II: Machiavelli to Bentham, 252 History of Western Political Thought III: Burke to Rawls, 285 International Relations of the Western Hemisphere

Psychology (PSYC)

Professors: Owen R. Floody, Eugenia P. Gerdes, Andrea R. Halpern, T. Joel Wade (Chair)

Associate Professors: Chris J. Boyatzis, Kimberly A. Daubman, David W. Evans, William F. Flack Jr., Peter G. Judge, Kevin P. Myers, John T. Ptacek, Arthur G. Shapiro

Scientific psychology analyzes the complex interactions between environmental and biological bases of behavior to study human and animal behavior. Students are trained in scientific methods and different theoretical perspectives in a variety of areas of psychology: physiological psychology, neuropsychology, sensation and perception, cognition, learning, child and adult development, social psychology, personality, health psychology, abnormal

psychology, and animal behavior. In short, psychology analyzes the complex interactions between environmental and biological bases of behavior.

Through acquiring a better understanding of behavior and scientific methods, psychology majors are well prepared to enter many fields. A major in psychology can lead to graduate study and a career in many areas of psychology, from experimental to clinical/counseling work, and psychology majors also pursue education and careers in law and medicine as well as work in the corporate and not-for-profit sectors.

A **major** in psychology consists of nine course credits:

- PSYC 100 General Psychology
- PSYC 215 Psychological Statistics or MATH 216 Statistics
- Five 200-level courses. At least one course must come from each of the A, B, and C clusters. No more than one course from Cluster C and one course from Cluster D may count toward the major.

  Cluster A
  PSYC 203 Psychology of Learning
  PSYC 204 Human Cognition
  PSYC 250 Physiological Psychology
  PSYC 252 Sensation and Perception
  PSYC 266 Animal Behavior

  Cluster B
  PSYC 207 Developmental Psychology
  PSYC 209 Social Psychology
  PSYC 210 Abnormal Psychology
  PSYC 212 Psychology of Emotion
  PSYC 228 Personality Psychology

  Cluster C
  PSYC 290 Applied Research Methods Seminar in Physiological Psychology
  PSYC 291 Applied Research Methods Seminar in Abnormal Psychology
  PSYC 292 Applied Research Methods Seminar in Sensation and Perception
  PSYC 293 Applied Research Methods Seminar in Learning
  PSYC 294 Applied Research Methods Seminar in Human Cognition
  PSYC 295 Applied Research Methods Seminar in Emotion
  PSYC 296 Applied Research Methods Seminar in Animal Behavior
  PSYC 297 Applied Research Methods Seminar in Developmental Psychology
  PSYC 298 Applied Research Methods Seminar in Personality
  PSYC 299 Applied Research Methods Seminar in Social Psychology

  Cluster D
  PSYC 232 Psychology of Women
  PSYC 233 Black Psychology
  PSYC 234 Sport Psychology
  Or additional psychology courses with departmental approval.

- Two courses above the 200 level, at least one of which must be taken at Bucknell. Majors may use an independent research course (PSYC 329, PSYC 360, or one of the corresponding Capstones on behavioral research) to satisfy one of these requirements.

- Majors should complete PSYC 215 by the end of the sophomore year. All 200-level requirements, including the research methods seminar, should be completed by the end of the junior year. The optimal scheduling of these courses should be determined in consultation with a member of the department, and is especially important for students who enter the major late, hope to study abroad, or have strong preferences among alternative courses.

The department strongly encourages students to engage in independent research, done in close collaboration with a faculty member. Seniors, if academically eligible, often conduct senior honors projects and many others conduct independent studies. Many psychology majors study abroad for a semester and courses taken abroad usually transfer.

Two **minors** are offered in psychology. The cognitive and perceptual sciences minor can be completed in one of two ways: 1) For students who take PSYC 100, the minor consists of PSYC 100, Statistics (PSYC 215 or equivalent), PSYC 204, PSYC 252, PSYC 292 or PSYC 294, and PSYC 318 or PSYC 352; 2) For students who do not take PSYC 100, the minor consists of Statistics (PSYC 215 or equivalent), PSYC 204, PSYC 252, PSYC 292 or PSYC 294, PSYC 318 and PSYC 352. With the approval of the department chair, a research project in cognition or perception (PSYC 329, PSYC 360, or one of the corresponding Capstones on behavior research) could be substituted for either PSYC 318 or PSYC 352 for those students who do not take PSYC 100.

The neuropsychology minor requires six courses: PSYC 100, PSYC 204, PSYC 215 or equivalent, PSYC 250, PSYC 349, and one of PSYC 210, PSYC 212, PSYC 252, PSYC 305, PSYC 309, PSYC 318, PSYC 339, PSYC 343, or PSYC 352. With the approval of the department chair, independent research in neuropsychology (PSYC 329, PSYC 360, or one of the corresponding Capstones on behavior research) may be used to satisfy this last requirement.

A program for honors in psychology must include PSYC 360 or the corresponding Capstone on behavioral research.

Nonmajors are encouraged to discuss sequences of courses appropriate to their academic goals with any member of the department.

100. General Psychology (I and II; 3, 2)
A survey of concepts, principles, and theories of an empirical science of behavior.

203. Learning (I and II; 3, 0)
The study of basic mechanisms of associative learning in motivated behavior, especially Pavlovian and operant conditioning in the behaviors of various species. Prerequisite: PSYC 100 or ANBE 266 or permission of the instructor.

204. Human Cognition (I and II; 3, 0)
A survey of the theories and methods employed in studying human mental abilities. Issues include attention, memory, language, problem solving, and decision making. Prerequisite: PSYC 100 or permission of the instructor.

207. Developmental Psychology (I and II; 3, 0)
Study of stages, sequences, and processes in normal child development, prenatal through childhood. Emphasis on cognitive, social, emotional development. Prerequisite: PSYC 100 or permission of the instructor.

209. Social Psychology (I and II; 3, 0)
Theories of social influence and social interaction, their empirical foundations and implications for the individual and society. Prerequisite: PSYC 100 or permission of the instructor.

210. Abnormal Psychology (I and II; 3, 1)
An introduction to psychological disorders and the major theories proposed to account for them. Includes a practicum in a psychiatric facility. Prerequisite: PSYC 100 or permission of the instructor.

212. Emotion (I; 3, 0)
An introduction to theory and research in the psychology of emotion. Prerequisite: PSYC 100 or permission of the instructor.

215. Psychological Statistics (I and II; 3, 1)
An introduction to basic statistical analyses in psychology. Prerequisite: PSYC 100 or ANBE 266 or permission of the instructor.

228. Personality Psychology (I and II; 3, 0)
Evaluation of theory and research on personality, including consideration of classic theories and their applications in current research. Prerequisite: PSYC 100 or permission of the instructor.

231. Community Organizations in Northern Ireland (S; 3, 0)
Case studies of local organizations, community situations, or social movements in Northern Ireland. This is the service-learning course in the Bucknell in Northern Ireland program. Prerequisite: permission of the instructor. Crosslisted as EDUC 331 and/or SOCI 331.

232. Psychology of Women (I or II; 3, 0)
Considers experiences of girls and women, gender differences, attitudes toward women, and issues of particular concern to women such as domestic violence, body image, and sexual assault.

233. Black Psychology (I or II; 3, 0)
Black self-concept, the black family and self-awareness, "black English," skin color and physical attractiveness standards, black self-esteem, black views on prejudice and discrimination.

234. Introduction to Sport Psychology (S; 3, 0)
Considers the individual difference factors influencing athletic performance (e.g., cognitive, behavioral, and emotion). Also considers psychological processes operating in group (e.g., cohesion, leadership, aggression, and audience effects).

250. Physiological Psychology (I and II; 3, 0)
Biological bases of behavior and their relationship to motivation, learning, and perception. Prerequisite: PSYC 100 or BIOL 206 or ANBE 266 or permission of the instructor.

252. Sensation and Perception (I and II; 3, 0)
Anatomy and functions of the sensory systems: vision, audition, kinesthesis, vestibular sensation, taste and smell, with emphasis on theory and abnormalities of the human sensory systems. Prerequisite: PSYC 100 or permission of instructor.

266. Animal Behavior (I; 3, 0)
A survey of important theories, issues, and empirical techniques in the interdisciplinary field of animal behavior, emphasizing both proximate and ultimate explanations for behavior. Crosslisted as ANBE 266/BIOL 266.

290. Applied Research Methods Seminar in Physiological Psychology (I or II; 0, 3)
Laboratory research to accompany PSYC 250 Physiological Psychology. Prerequisites: PSYC 215 and prerequisite or corequisite PSYC 250.

291. Applied Research Methods Seminar in Abnormal Psychology (I or II; 0, 3)
Laboratory and/or field research to accompany PSYC 210 Abnormal Psychology. Prerequisites: PSYC 215 and prerequisite or corequisite PSYC 210.

292. Applied Research Methods Seminar in Sensation and Perception (I or II; 0, 3)
Laboratory and/or field research to accompany PSYC 252 Sensation and Perception. Prerequisites: PSYC 215 and prerequisite or corequisite PSYC 252.

293. Applied Research Methods Seminar in Learning (I or II; 0, 3)
Laboratory and/or field research to accompany PSYC 203 Learning. Prerequisites: PSYC 215 and prerequisite or corequisite PSYC 203.

294. Applied Research Methods Seminar in Human Cognition (I or II; 0, 3)
Laboratory to accompany PSYC 204 Human Cognition. Prerequisites: PSYC 215 and prerequisite or corequisite PSYC 204.

295. Applied Research Methods Seminar in Emotion (I or II; 0, 3)
Laboratory-based research on the psychosocial causes, characteristics, and consequences of human emotion. Prerequisite: PSYC 215. Prerequisite or corequisite: PSYC 212.

296. Applied Research Methods Seminar in Animal Behavior (I or II; 0, 3)
Laboratory and/or field research to accompany PSYC 266 Animal Behavior. Prerequisites: PSYC 215 and prerequisite or corequisite PSYC 266. Crosslisted as ANBE 296.

297. Applied Research Methods Seminar in Developmental Psychology (I or II; 0, 3)
Students conduct observational research of children's behavior at Sunflower Child Care Center near campus. Prerequisite: PSYC 215. Prerequisite or corequisite: PSYC 207.

298. Applied Research Methods Seminar in Personality (I or II; 0, 3)
Laboratory, field, or applied research to accompany PSYC 228 Personality Psychology. Prerequisites: PSYC 215 and prerequisite or corequisite PSYC 228.

299. Applied Research Methods Seminar in Social Psychology (I or II; 0, 3)
Laboratory and/or field research to accompany PSYC 209 Social Psychology. Prerequisites: PSYC 215 and prerequisite or corequisite PSYC 209.

301. History of Psychology (II; 3, 0)
A history of scholarly ideas about thought, feelings, and behavior. Prerequisite: PSYC 100.

304. Advanced Developmental Psychology (I or II; 3, 0)
Analysis of selected topics in human development, such as gender issues, cognitive development, parenting and sibling relations, or religious and spiritual development. Prerequisite: PSYC 207 or permission of the instructor.

305. Developmental Psychopathology (I or II; 3, 0)
Readings and discussion address the behavioral phenotypes (cognitive, social, linguistic) of a variety of neurodevelopmental and neuropsychiatric disorders in childhood in the context of theories and process of typical development. Basic genetic and neurobiological underpinnings of neurodevelopmental and neuropsychiatric disorders also are discussed. Prerequisites: NEUR 248 or PSYC 210 and PSYC 207. Crosslisted as NEUR 305.

306. Advanced Abnormal Psychology (I or II; 3, 0)
Analysis of specific topics in the fields of psychopathology and/or clinical psychology. Prerequisite: PSYC 210 or permission of the instructor.

307. Culture and Child Development (I or II; 3, 0)
Study of culture-specific and universal processes of child development in diverse societies. Cultural issues in family, education, government, religion, labor, war, hunger. Prerequisite: PSYC 207 or permission of the instructor.

309. Appetite and Eating Behavior (I or II; 3, 0)
Advanced seminar considering psychological factors involved in appetite, food preferences, and food intake. Prerequisite: PSYC 203.

316. Advanced Social Psychology (I or II; 3, 0)
Consideration of experimental and theoretical issues in social psychology. Prerequisite: PSYC 209 or PSYC 228 or permission of the instructor.

317. Comparative Animal Cognition (I or II; 3, 0)
Advanced seminar in issues of nature/nurture, learning, development, and adaptation, in behaviors such as foraging, mating, and communication in several species. Prerequisite: PSYC/ANBE 266 or PSYC 203. Crosslisted as ANBE 317.

318. Cognitive Aging (I or II; 3, 0)
Seminar discussing the development and changes in cognition in senior citizens. Topics include memory, language, attention, and decision-making. Prerequisite: PSYC 252 or PSYC 204 or permission of the instructor.

319. Topics in Psychology (I or II; R; 3, 0)
Occasional seminars on selected topics of current interest in psychology. Prerequisite: permission of the instructor.

324. Analysis of Psychological Data (I or II; 3, 0)
A survey of advanced statistical techniques with emphasis on analysis and interpretation of experimental and correlational data. Prerequisite: PSYC 215 or equivalent and permission of the instructor.

325. Advanced Personality Theory (I or II; 3, 0)
Consideration of current issues in personality psychology. Possible topics include: persons and situations, personality and health, and personality and relationships. Prerequisite: PSYC 228 or permission of the instructor.

329. Undergraduate Research (I or II; S; R; 0, 3) Half to full course.
Research or other independent study on any aspect of psychology. Research topics may be posed by students or faculty. Prerequisite: permission of the instructor.

330. Sectarian Conflict in Northern Ireland (S; 3, 0)
Psychological and social aspects of the sectarian conflict in Northern Ireland. This is the seminar course in the Bucknell in Northern Ireland program. Prerequisites: PSYC 207 or PSYC 209 or PSYC 210 or PSYC 228 and permission of the instructor. Crosslisted as SOCI 330.

339. Psychology of Music (I or II; 3, 0)
Seminar examining how musicians and non-musicians comprehend, remember, perform, and respond to music, including developmental aspects. Some background in music is required. Prerequisites: PSYC 204 or PSYC 252 and permission of the instructor.

343. Neural Plasticity (I; 3, 0)
Brain structure and function, emphasizing cellular and molecular approaches to neural development, plasticity and degeneration. Prerequisites: PSYC 250 or BIOL 205 and permission of the instructor. Crosslisted as BIOL 343.

349. Human Neuropsychology (I or II; 3, 0)
Brain mechanisms of language, memory, and other processes as revealed by studies of human brain activity or pathology. Prerequisite: PSYC 204 or 250 or 252 or permission of the instructor.

352. Advanced Perception (I or II; 3, 0)
Theories of and research on sensory and perceptual processes. Prerequisite: PSYC 204 or 250 or 252 or permission of the instructor.

360. Honors Thesis (I and II; R)
Prerequisite: permission of the department.

369. Psychology of Beauty and Attraction (I or II; 3, 0)
Examination of research on beauty and attraction from an evolutionary perspective. Prerequisites: PSYC 209 and permission of the instructor.

370. Primate Behavior and Ecology (I; 3, 3*)
Introduction to research on prosimians, monkeys, and apes with emphasis on the evolutionary origin of diversity, habitat use, social structure, social behavior, and cognitive abilities. Prerequisites: BIOL 122 or 208, or ANBE/BIOL/PSYC 266, and permission of the instructor. Crosslisted as ANBE/BIOL 370.

373. Psychology of Race and Gender (I or II; 3, 0)
Critical analysis of major theories. Emphasis on experimental research findings in the areas of racism, discrimination, gender difference, sexual violence, etc. Prerequisites: PSYC 209 and permission of the instructor.

Religion (RELI)

Associate Professors: Maria Antonaccio (Chair), Rivka B.K. Ulmer, Carol Wayne White

Assistant Professors: Paul A. Macdonald, Karline M. McLain, James Mark Shields

Religion addresses the experiences, narratives, and imagination of individuals and groups as they strive to articulate meaningful lives. As an academic study, religion focuses both on institutional formations associated with traditions and world religions as well as social,

cultural, and political developments that evoke ultimate commitments from participants. Coursework in the discipline serves to provide students with an understanding of key approaches, concepts, and practices in the study of religion. Such study helps students acquire the skills needed for reflection upon the human quest for transformation and meaning.

A major in religion provides the context for historical and conceptual engagement with some of the most profound ideas, thinkers, and questions that challenge humanity. It also serves as the first stage for those interested in graduate work or a professional career in religion. Majors in religion have followed diverse national and international careers such as business, law, journalism, non-profit organizations, and public service.

A **major** in religion consists of eight courses, including one of the 100-level introductory courses. Students majoring in religion, in consultation with a department adviser, will design a program of courses in accord with their own educational aims, and with the departmental requirements outlined below.

The program of courses for each major will include at least one, but not more than two, introductory courses. A student majoring in religion will take at least one course from each of the three curricular areas, i.e., "Western" Religious Traditions, "Non-Western" Religious Traditions, and Religion, Culture, and Theory. Finally, a major will take one religion Capstone, namely CAPS 427. Requests for exemption from one or more of these requirements will be considered by the department chair upon petition by the student major.

Religion majors are encouraged to pursue off-campus study either abroad, e.g., the Friends World College program, or in approved domestic programs in order to broaden their understanding of religious pluralism both globally and in the United States. No more than two religion courses earned off campus may be used to meet the major requirements. Transfer students may appeal this restriction by writing to the chair of the department.

The religion department encourages majors to consider honors candidacy by completing an honors thesis in their final academic year. Students wishing to undertake an honors thesis should consult with their adviser in the fall semester of their junior year and declare their intentions and their thesis topic in the spring semester of their junior year.

The **minor in religion** consists of any four courses, one of which must be an introductory course, i.e., RELI 100, RELI 105, RELI 110, RELI 115, RELI 125, or RELI 180. Students considering a minor are invited to discuss their interests with a department faculty member.

In addition to the above described minor in religion, students may elect a minor in Jewish studies.

The **minor in Jewish studies** consists of four courses from the lists below: at least one "core" course, the primary focus of which is Judaism, not more than one "secondary" course, the focus of which includes Judaism, and not more than two "topics" courses, when the focus of the course includes Judaism and the course has the approval of the department chair.

Core Courses: (The primary focus of which is Judaism.)

RELI 205	Hebrew
RELI 209	Israel: Land, People, and Tradition
RELI 210	Judaism

RELI 211	Women in Judaism
RELI 307	Post-biblical Literature

Secondary Courses: (The focus of which includes Judaism.)

RELI 105	Introduction to the Bible
RELI 110	Introduction to Judaism, Christianity, and Islam

Topics Courses: (When the focus of the course includes Judaism and the course has the approval of the department chair)

RELI 228	Religions in the Modern World
RELI 234	Issues of Religion and Culture
RELI 310	Topics in Religion and Law
RELI 315	Topics in American Religion
RELI 319	Individual Studies in Religion
RELI 320	Individual Studies in Religion
RELI 325	Major Religious Thinkers
RELI 326	Major Religious Movements
CAPS 427	Capstone

Introductory Courses

100. Introduction to Religion (I or II; 3, 0)
This course will introduce students to the academic study of religion and will examine such basic religious categories as history, myth, ritual, and text. Prerequisite: first-year or sophomore standing. Others by permission of the instructor.

105. Introduction to the Bible (I or II; 3, 0)
Critical, literary, and historical analyses of Hebrew (Tanak) and Christian scriptures. Prerequisite: first-year or sophomore standing. Others by permission of the instructor.

110. Introduction to Judaism, Christianity, and Islam (I or II; 3, 0)
Basic teachings of Judaism, Christianity and Islam concerning God, human nature, sin and salvation, and major historical changes in each tradition. Prerequisite: first-year or sophomore standing. Others by permission of the instructor.

115. Introduction to Asian Religions (I or II; 3, 1)
A comparative study of the basic teachings and practices of Asian religions through lectures, discussions, readings, and films; inquiry into similarities and differences. Prerequisite: first-year or sophomore standing. Others by permission of the instructor. Crosslisted as EAST 115.

125. Introduction to Ethics (I or II; 3, 0)
This introductory course in ethical reflection draws from a variety of religious and philosophical perspectives to address a range of contemporary moral issues. Prerequisite: first-year or sophomore standing. Open to others by permission of the instructor.

180. Introduction to Religion in America (I or II; 3, 0)
This course will examine variety in American religion both in terms of diversity (the various religious traditions) as well as pluralism (cultural interaction and encounter). Prerequisite: first-year or sophomore standing. Others by permission of the instructor.

"Western" Religious Traditions

209. Israel: Land, People, and Tradition (AII; 3, 0)
Study of the complex relationship between Judaism and the sacred traditions of the Jews as related to the Land Israel and the city of Jerusalem.

210. Judaism (AI or II; 3, 0)
A survey of Jewish religious traditions, addressing major historical developments (e.g., biblical, rabbinic, and modern periods) and basic rituals and theological issues (e.g., "chosenness", covenant, salvation).

211. Women in Judaism (AII; 3, 0)
Survey of Jewish texts and films that focus specifically on women or use feminine imagery; considers feminist and historical-critical interpretations of the evolving role of Jewish women.

212. Christianity (AI or II; 3, 0)
An overview of the Christian religious tradition, dealing with major historical periods (biblical, medieval, modern) and basic theological and ethical issues (e.g., revelation, salvation, sources of moral authority).

213. God, Suffering, and Evil (I or II; 3, 0)
An investigation into the problem suffering and evil pose for western religions and Christian reflection on the existence and nature of God.

214. God, Nature, and Knowledge (I or II; 3, 0)
Study of various philosophical, religious, and scientific theories regarding God and nature.

215. Essentials of Christian Thought (I or II; R; 3, 0)
A survey of major topics in Christian thought, including God, creation, human nature, sin, salvation, the Christian life, the church, the status of other religions, and the future of human history and the world.

218. Christian Ethics (I or II; 3, 0)
Major trends in Christian ethics, with particular attention to the diversity of sources and methods used by Christian thinkers to reflect on practical moral issues.

221. God and Morality (I; 3, 0)
An overview of Western religious ethics, focusing on the relation between religion and morality, the connection between ideas of human selfhood and moral goodness, and the uses of argument to justify religious and moral claims.

223. History of Western Religious Thought (I; 3, 0)
A survey of the major religious ideas and problems which have shaped the Western intellectual tradition. Topics to be explored include conceptions of God, theories of human nature, and the relation between religious belief and cultural values.

225. Religion and Literature (I; R; 3, 0)
Examination of the religious, philosophical, and ethical quandaries confronting human beings through the study of literary works. Themes may include autobiography and the construction of identity; the nature of human freedom, love, and aspiration; the problems of evil, suffering, and alienation; the experience of moral conflict; and other topics.

241. Religion and the Loss of Traditional Faith (I or II; 3, 0)
Examination of new approaches (linguistic, philosophical, and hermeneutical) that challenge traditional religious ideas and the role of faith in the contemporary world. Emphasis is on intersection of religion and critical theory.

280. Religion and Constitutional Law (I or II; 3, 0)
This course explores the developing relationship between religion and American constitutional law, focusing on historic documents and Supreme Court decisions relating to the First Amendment.

281. Religion and American Politics (I or II; 3, 0)
This course explores the relationship of religion and American politics, focusing on the role and impact of religious groups and issues in contemporary elections.

307. Post-biblical Literature (I or II; R; 3, 0)
A survey of Jewish post-biblical literature and thought which may include one or more of the following: the literature of the Second Temple period and rabbinic literature (Pseudepigrapha, Dead Sea Scrolls, Targum, Josephus, Mishnah-Tosefta, Midrash, Talmud, Codices, Bible commentaries), in their religious, historical, literary and cultural contexts.

315. Topics in American Religion (I or II; R; 3, 0)
This course will examine specific topics in American religion including in-depth analyses of religious movements and traditions in America.

"Non-Western" Religious Traditions

200. Buddhism (II; 3, 1)
An interdisciplinary introduction to Buddhism, including basic teachings of liberation from suffering, impermanence, no-self, ethics, and meditation. Also explores the historical development of various streams of Buddhism in Asia and the West, with attention to the effect of Buddhism on society, politics, and material culture. Crosslisted as EAST 251.

201. Islam (II; 3, 0)
An overview of the many cultural expressions of this religion which emerged from the Arabian peninsula in the sixth century C.E. and spread through Eurasia to the larger world. The course will focus on the role of Muhammad as prophet, the Qur'an as scripture, and Hadith as religious narrative. The tensions between Law (Shar'iah), modernity, and mysticism (Sufism) also will be explored.

202. Hinduism (AI or II; 3, 0)
A historical survey of the family of Hindu religious traditions. This course traces the development of Hindu scriptures, rituals, philosophies, and ethics from the ancient to the contemporary world. Concepts such as karma, yoga, and reincarnation will be put in the broader contexts of Hindu dharma (religious law), theism, and ritual.

203. Hinduism and Film (II; 3, 0)
A survey of Indian cinema and Hinduism, exploring early Hindu mythological films, the underlying religious messages of popular "secular" films, and the influences of Hindu worship practices on Indian cinema.

243. Religions of South Asia (I or II; 3, R; 0)
Focused study of one or more South Asian religious traditions. This course centers on South Asian religions and on topics that may include, but will not be limited to: Hinduism, Jainism, Sikhism, Islam in Pakistan and India, and Buddhism in Tibet, Myanmar, and Sri Lanka.

244. Religions of East Asia (I; 3, 0)
Focused study on one or more East Asian religious traditions. This course centers on religions and on topics that may include, but will not be limited to: Confucianism, Daoism, Buddhism, Shinto, and new East Asian religious movements. Crosslisted as EAST 244.

245. Religions of China (I; 3, 0)
An introduction to the religious traditions of China through study of their origins, basic beliefs, practices and values, historical development, as well as their interaction and involvement with politics, culture, society and each other. Focus on the three major traditions – Confucianism, Daoism, and Chinese Buddhism. Crosslisted as EAST 252.

246. Religions of Japan (II; 3, 1)
An introduction to the religious traditions of Japan through study of their origins, basic beliefs, practices and values, historical development, as well as their interaction and involvement with politics, culture, society and each other. Focus on Shinto and the various forms of Japanese Buddhism. Crosslisted as EAST 253.

247. Epic India: Comics, Films, Text (I; 3, 0)
Survey of the great Indian religious epics, focusing on how these stories are retold in new times and places, and how they're recast in new media.

Religion, Culture, and Theory

216. Philosophy of Religion (I; 3, 0)
Problems for rational inquiry arising from the claims and practices of religious faith, e.g., the nature of religious language, arguments for the existence of God, the concept of evil. Crosslisted as PHIL 223. Prerequisite: PHIL 98 or PHIL 100 or PHIL 103 or PHIL 201 or PHIL 220 or RELI 125, or permission of the instructor.

220. Comparative Ethics (AI or II; 3, 0)
An examination of the symbols, concepts, beliefs, and practices of a variety of religious traditions and their role in providing ethical guidance for human life. Special attention will be given to critical methods of comparative analysis and their application to diverse traditions.

226. Environmental Ethics (II; 3, 0)
A broad survey of the central theoretical and practical approaches being debated in environmental ethics.

234. Issues of Religion and Culture (AI or II; R; 3, I)
Focus on interdependence of religion and cultural phenomena: ideology; alienation; formation of world view; understandings of time and space; relation between church and state; faith and science.

235. Religion and Popular Culture (I or II; 3, 0)
This course examines the relationship of religion to contemporary popular culture, both in how religion is portrayed (in music, movies, and on television) and how it is replicated (in ritual, myth, and morality).

240. Perspectives in Religion and Science (II; 3, 0)
Survey of theories, topics, and problems involved in understanding the historically evolved and complex relationship between Western religion and science and their respective truth claims.

310. Topics in Religion and Law (I or II; R; 3, 0)
This course will examine aspects of the relationship between religion and law in global, regional, tradition-based, and/or historical contexts.

Individual and Specialized Study of Religion
319 and 320. Individual Studies in Religion (I and II; R; 3, 0) Half to two courses
Guided investigations. Open to qualified students with some previous study of religion who wish to pursue individual programs of study in the field. Prerequisite: permission of the department chair.

325. Major Religious Thinkers (AI or II; R; 3, 0)
The thought, historical setting, and influence of one or more classical religious thinkers, e.g., Paul the Apostle, Augustine, Kierkegaard, Confucius, Rosenzweig, Gandhi.

326. Major Religious Movements (AI or II; R; 3, 0)
Origins, beliefs, and significance of selected religious communities and movements, e.g., Mysticism, Modern Catholicism, Evangelicalism, Monasticism, Religious Socialism.

330. Theories of Religion (I or II; 3, 0)
An exploration of theoretical models and methods employed in the study of religion. Readings will be from major texts, which may include sociological, psychological, anthropological, and phenomenological approaches, along with recent challenges to such theories from thinkers of feminist, postmodern, and postcolonial perspectives.

350. Honors Thesis (I and II; 3, 0)

Courses offered occasionally: 205 Hebrew, 219 Contemporary Religion: Race, Gender, and Sexuality, 224 Religion and Ecology, 227 Bioethics: Issues in Ethics, Medicine, and the Life Sciences

Residential College (RESC)

Academic Co-Coordinators: Janet Knoedler, Thomas Rich

This program seeks to enrich students' learning experience by integrating academic life into the residence halls. There are six residential colleges (Arts, Environmental, Global, Humanities, Social Justice, and Society and Technology), each organized around a common theme, and each with common courses for first-year students. All students enrolled in a residential college live on the same residence hall floor and take a common course. Students organize extensive extracurricular programs related to the college themes. Upperclass

students who wish to continue their affiliation with a college may continue to live together or take additional courses.

All of the courses offered in the Residential Colleges fulfill the Foundation Seminar requirement for Arts and Sciences students; some Residential College courses fulfill English or Humanities requirements for engineering students. Residential College Foundation Seminars which have been taught recently include:

Arts College: Discovery of the Expressive Self; You Call That Art?; Wearable Art

Environmental College: Nature and Human Choice; The Sixth Extinction; Islands and Beaches

Global College: Modern World System

Humanities College: Myth, Reason, Faith

Social Justice College: Speaking Out; Struggling for Justice; Rage Against the Machine

Society and Technology College: Designing People; Utopia and Dystopia; Technology, Disease and History: The Apple Paradox; Dream Machines

115. Community Service for Social Justice (II; 1.5, 0) Half course.
Students will design and carry out a community service project under the supervision of a faculty member. There will be one class meeting per week. The project will involve one month of research into local community needs and exploration of alternative service projects, followed by weekly community service activities for the remainder of the semester. Open only to first-year students enrolled in the Social Justice College. Prerequisite: permission of the instructor.

150. Art, Nature, Knowledge (I or II; 4, 0)
An interdisciplinary study of selected works in art, music, literature, science, and philosophy from the Renaissance through the 19th century. Crosslisted as ENGL 150, HUMN 150, and PHIL 150.

219. Peace Studies (II; 3, 0)
Ideologies and institutions of contemporary war-making societies and of the peace movements within them. Non-violence, feminism, and other ideologies as movements, practices, and concrete contributions to peace. Crosslisted as UNIV 219.

Russian

See Foreign Language Programs

Sociology and Anthropology

Professors: Thomas C. Greaves, Linden F. Lewis (Chair), Carl Milofsky, Paul H. Noguchi, Matthew Silberman

Associate Professors: Deborah A. Abowitz, A. Tristan Riley, Marc Schloss

Assistant Professors: John C. Bridges (visiting), Elizabeth Durden, Michelle C. Johnson, Edmund Searles

The department encompasses two disciplines, sociology and anthropology, and offers separate majors in each.

Sociology
Sociology is the study of human social action. It emphasizes an appreciation of human diversity, social inequality, and the processes that govern groups, organizations, communities, cultures, and nation states. Because these areas of study are integral to a liberal arts education, the department encourages students with diverse majors to take courses at all levels.

Among other things, a major in sociology may assist those interested in graduate work. It also offers a background for careers in law, journalism, government and international affairs, teaching, social work, and public service.

Anthropology
The central reason human beings are different from other animals is an adaptational breakthrough called culture. Anthropology focuses on different cultural solutions to such questions as how to live compatibly with the surrounding environment and with each other. Its study of human diversity in its many forms contributes essential elements to a liberal arts education.

The aim of the major is to introduce students to the anthropological understanding of human society. Instruction is offered on various topical issues, on the ways of life characteristic of particular world regions, and on the ways in which anthropology is employed to solve practical problems. Students may go on to graduate work but anthropology furnishes skills and conceptual tools useful in a wide variety of life and career objectives.

Both the sociology and the anthropology majors encourage students to include original research and off-campus experiences in their program of study. We make field research and internship opportunities available in several of our courses as well as via study abroad and in other areas of the U.S. These offerings are available in both sociology and anthropology. We encourage students interested in off-campus field research to take several of these courses beginning in their second or third year at Bucknell, although seniors with no prior experience are usually admitted to field study courses.

Sociology Major (SOCI)
The sociology major is divided into three sub-areas: a general major in sociology; the concentration in legal studies; and the concentration in human services. Sociology majors must select one of these three options or, with the assistance of a departmental sponsor, formulate a concentration of their own design.

The general major in sociology requires that students complete eight courses in the department, although students may count one anthropology course towards the major. Students taking one of the concentrations are required to complete 10 courses, two of which must be outside the department of sociology and anthropology. A student in a concentration may take no fewer than six courses in the department, with a minimum of five in sociology.

No more than two 100-level courses may be counted towards the sociology major in either the general major or the concentrations. Students should register for the concentrations when declaring the major so the registrar can assist them in keeping track of their progress through the program. Students may, however, select a concentration at any time.

The general major in sociology provides students with an overview of the discipline and exposure to a variety of specialty areas in the field. The general major is intended for students who wish a broad exposure to social issues and sociological concerns, either as part of their liberal arts education or in preparation for graduate study in the field. The general major is best suited for students who wish to study more than one area of sociology in depth.

Legal Studies and Human Services by their nature transcend the boundaries of any single discipline. Concentrators are required to take core courses of the major and a sequence of courses specific to the concentration. The concentrations are offered to allow students to study a particular area of sociology in depth and to allow students to substitute specified courses in other social science disciplines for courses that they otherwise would be required to take in sociology to satisfy the major. Students in the Human Services concentration are especially likely to engage in field research.

The General Major in Sociology

The general major in sociology requires that students take eight courses, no more than two of which may be at the 100-level in the department and no more than one of which may be an anthropology course. Requirements are as follows:

- Two sociology core courses: SOCI 208 Methods of Social Research and either SOCI 211 Classical Sociological Theory, or SOCI 212 Contemporary Sociological Theory. The department strongly recommends that core courses be taken as early as possible in a student's career in the major. Students should take at least one sociology course at the 100 or 200 level before taking SOCI 208 Methods of Social Research. SOCI 208 is not intended for first-year students or first-semester sophomores.
- Two courses in sociology at the 300 or 400 level, at least one of which is a seminar. 400-level courses are Capstone courses. Those with the SOCI designation, in addition to meeting the requirement for seminar courses at the 300 or 400 level, also fulfill the university Capstone requirement.
- Four other courses in sociology, or three courses in sociology and one in anthropology. Courses that are crosslisted as sociology and anthropology courses count as sociology courses and still allow sociology majors to take one course designated solely as an anthropology course. Students may elect to have either or both of the following courses count towards a major in sociology: GEOG 210 The Urban Condition and RUSS 253 Folklore and Ritual.

  With the exception of Bucknell-sponsored programs like Bucknell *en France*, Bucknell in Barbados, Bucknell in London, or Bucknell in Northern Ireland, courses taken off campus normally may not substitute for one of the core course requirements or for the 300- or 400-level seminar courses. The department chair may allow an exception if provided with clear information about the character and quality of off-campus courses and if these courses adequately substitute for material that would be taught on campus. No more than two off-campus courses are ordinarily counted toward the major.

Concentration in Human Services
Supervisor: Prof. Milofsky

The concentration in human services includes courses on specific service institutions like schools, health care, social welfare, criminal justice, community, and religion that are combined with an emphasis on field research experiences. Core courses require that students work in the community. Extensive and effective help is provided as students do that work. Field experiences are a valuable part of a liberal arts education and we encourage all students to partake in them. This curriculum is particularly useful, however, to students who plan to enter social work, education, community work, and the health sciences. Many students go on to graduate school in social work, education, or medicine. Other students find that field experience and the data collection skills that we teach are excellent preparation for finding work with only a B.A. in organizations that provide direct human services.

The concentration in human services requires completion of 10 courses. Two are core requirements of the sociology major (SOCI 208 and either SOCI 211 or SOCI 212) and two others are core requirements for the concentration (SOCI 215 and SOCI/ANTH 201). Students should take at least one sociology course at the 100 or 200 level before taking SOCI 208 Methods of Social Research. SOCI 208 is not intended for first-year students or first-semester sophomores. Similarly, SOCI 215 and SOCI/ANTH 201 are open only to second-year students and above except with permission of the instructor. Students also must take a 300- or 400-level course (which may be a Capstone) specifically related to the concentration. Also required are two courses in sociology or anthropology related to human services and one course in sociology not related to human services. Students also must complete two additional courses related to human services in disciplines other than sociology or anthropology. A fuller description of the concentration and a complete, up-to-date list of courses that may be taken for credit towards the concentration is provided on the department's website: www.bucknell.edu/x698.xml

Concentration in Legal Studies
Supervisor: Prof. Silberman

The concentration in legal studies requires 10 courses, no more than two of which may be at the 100 level in any department. The following courses are required:

- Two sociology core courses: SOCI 208 Methods of Social Research and either SOCI 211 Classical Sociological Theory, or SOCI 212 Contemporary Sociological Theory. The department strongly recommends that core courses be taken as early as possible in a student's career. Students should take at least one sociology course at the 100 or 200 level before taking SOCI 208 Methods of Social Research. SOCI 208 is not intended for first-year students or first-semester sophomores.
- SOCI 123 Law and Society and SOCI 433 Seminar in Law and Society
- A minimum of one and a maximum of three law-related courses in the department of sociology and anthropology. These courses include: ANTH 227 Witchcraft and Politics; SOCI 215 Human Service Systems; SOCI 234 Criminology; SOCI 239 Deviance and Identity; SOCI 250 Power and Control in Society; or SOCI 251 Violence and Society
- One course in sociology or anthropology not related to law
- A minimum of two and a maximum of four courses outside of sociology and anthropology that are related to law. Courses include: CAPS 431 Women and the Penal

System; ECON 330 Law and Economics; ENGL 460 Law and Literature; ENST 255 Environmental Justice; ENST 260 Environmental Law; IREL 255/POLS 278 International Law; IREL 310 Human Rights; MGMT 220 Business Law I; PHIL 100 The Fields and Functions of Philosophy: Law, Morality, and Society; PHIL 103 Logic; PHIL 201 Symbolic Logic; PHIL 213 Ethics; PHIL 214 Social and Political Philosophy; PHIL 228 Contemporary Ethical Theory; PHIL 311 Ethics and The Natural World; POLS 240 The American Congress; POLS 244 American Judicial Policymaking; POLS 256 Topics in Social and Political Ethics; POLS 260 Topics in Legal Thought; POLS 261 20th-century American Legal Thought; POLS 263 Race and Ethnicity in American Legal Thought; POLS 290 Topics in Politics: Constitutional Law; POLS 380 Human Rights; RELI 125 Introduction to Ethics; RELI 220 Comparative Religious Ethics; RELI 226 Environmental Ethics; RELI 227 Bioethics: Issues in Ethics, Medicine, and the Life Sciences; RELI 280 Religion and Constitutional Law; RELI 310 Topics in Religion and Law; or UNIV 228 Legal and Ethical Issues of the Press. Students may have courses not on this list counted towards the legal studies concentration with the approval of their faculty advisers, the concentration adviser, or the department chair.

The Minor in Sociology

The minor in sociology requires five courses in sociology. Students may count no more than two 100-level courses toward the five courses required. Courses in anthropology may not be counted towards the sociology minor unless courses are listed as satisfying both sociology and anthropology major credit. No more than one off-campus course ordinarily counts toward the minor.

Honors

The department strongly encourages qualified majors to consider working for honors in sociology. Such students should consult in their junior year with one or more members of the faculty of the department to begin defining a research topic and writing a proposal. Normally, during the senior year, an honors student will enroll in SOCI 319 and, if agreed to by the academic adviser, a second semester in SOCI 320. The honors proposal is to be approved by the department chairperson and submitted to the Honors Council by mid-October of the senior year. Further information can be obtained from the student's academic adviser, the department chairperson, and from the Honors Council.

100. Introduction to Sociology (I and II; 3, 0)

The concepts and methods sociologists use to investigate human groups. Focuses on the study of social organization, its variety and development.

110. Social Problems in the 21st Century (I or II; 3, 0)

Focuses on the sociological approach to social problems, studying existing problems like poverty and inequality plus new or changing problems such as war and terrorism.

123. Law and Society (I or II; 3, 0)

Introduction to law and the legal system. The effects of economic, political, and other social institutions on the social organization of criminal and civil law.

130. Medicine and Society (I or II; 3, 0)
Sociological analysis applied to health and medical care. Distribution of disease and services, behavior in response to illness, medical professions, hospital organization, national policy issues.

140. American Culture and Society (II; 3, 0)
Exploration of topics including individualism, youth, culture, media, sport, health and the body, education, immigration, religion, sex, and death.

201. Field Research in Local Communities (I or II; 3, 0)
Participant observation, interviewing and other field research methods. Students will carry out exercises and projects in local communities. Crosslisted as ANTH 201.

208. Methods of Social Research (I or II; 3, 0)
An introduction to various paradigms of social research with emphasis on the logic of social inquiry, research design, and data collection. Prerequisites: two prior sociology courses and permission of the instructor.

210. Urban Condition (I; 3, 0)
Geographic and sociological inquiry into pressing urban issues of advanced industrialized societies, including inequality, housing, employment, and how cities fit into the American present and future. Crosslisted as GEOG 210.

211. Classical Sociological Theory (I or II; 3, 0)
A survey of major theories and theoretical traditions in sociology from 1800 to approximately 1920.

212. Contemporary Sociological Theory (I or II; 3, 0)
Analysis and application of contemporary sociological theories.

213. Race in Historical and Comparative Perspective (I; 3, 0)
Explores the evolution of the concepts of race and racism from antiquity to the present. Prerequisite: any sociology or anthropology course, or permission of the instructor.

215. Human Service Systems (I; 3, 0)
Historical and contemporary development of social services in relation to changing political-economic structures and human needs. Emergence and impact of service organizations and professions. Recommended as prerequisite for SOCI 318.

234. Criminology (I or II; 3, 0)
Theories and research in criminal behavior and the societal reaction to criminality. Causes and consequences of crime, including public policy formulations.

239. Deviance and Identity (I or II; 3, 0)
Social organization and personal action; group dynamics, identity, commitment, and deviant behavior.

243. Sociology of Race and Ethnicity (AI; 3, 0)
Studies the concepts and social significance of race/ethnicity and major race/ethnic groups within the United States. Emphasis on varying theoretical and methodological approaches to the sociological study of race/ethnicity.

245. Remaking America: Latin American Immigration (II; 3, 0)
The processes and impacts of Latin American immigration on the U. S. and countries of origin. Special emphasis on how the immigration experience varies by ethnicity, location, and gender.

251. Violence and Society (II; 3, 0)
The study of violent social, political, and legal institutions: domestic violence, sexual coercion, vigilantism, political conflict; the production and control of criminal violence.

269. Power, Protest, and Political Change (AI; 3, 0)
Explores the life cycle of social movements. Looks at mobilization, tactic selection, and the legacies of "passionate politics" through specific cases of social movement activity. Crosslisted as POLS 249.

270. Popular Culture (II; 3, 0)
The role of popular culture (e.g., music, television, film, and other media) in constructing individual and collective identities.

280. Twentieth-century Afro-Caribbean and African American Thought (II; 3, 0)
Study of the intellectual contributions and scholarly vision of people of African descent to sociological theory, social philosophy, and social change in the 20th century. Crosslisted as HIST 261.

290. The Sociology of Caribbean Society (AII; 3, 0)
Examines the history, politics, culture, society, ecology, and peoples of the Caribbean. It also focuses on the region's importance, its most pressing concerns and its future in the global political economy.

306. Video Ethnography (II, 3, 2)
A practicum in using video technology to conduct observational social research. Students will create short videos in the course. Prerequisite: permission of the instructor.

310. The Sociology of Developing Societies (II; 3, 0)
Examines various conceptions of development and how they are implemented in selected countries. Prerequisite: any sociology or anthropology course, or permission of the instructor.

311. Globalization, Technology, and Cultural Change (I; 3, 0)
Examination of the impact of the processes of global restructuring and the technological revolution on people, culture, and society. Prerequisite: any course in sociology.

315. Educational Policy and School Organization (I; 3, 0)
Topics in the sociology of education: schools as causes of social inequality; organizational problems in school reform; and relationships between schooling and work careers. Prerequisite: permission of the instructor.

319 and 320. Honors Course in Sociology (I or II; R; 0, 12)
Each student selects a project to be developed individually. Prerequisite: permission of the department.

322. Sociology of Medicine (I or II; 3, 0)
A seminar in which topics of interest to students in the area of the sociology of health, medicine, and medical policy will be discussed.

325 and 326. Advanced Reading in Sociology (I or II; R; 0, 12) Half to two courses.
Readings developed around the interest of individual students. Prerequisite: permission of the instructor.

330. Sectarian Conflict in Northern Ireland (S; 3, 0)
Psychological and social aspects of the sectarian conflict in Northern Ireland. This is the seminar course in the Bucknell in Northern Ireland program. Prerequisites: PSYC 207 or PSYC 209 or PSYC 210 or PSYC 228 and permission of the instructor. Crosslisted as PSYC 330.

331. Community Organizations in Northern Ireland (S; 3, 0)
Case studies of local organizations, community situations, or social movements in Northern Ireland. This is the service-learning course in the Bucknell in Northern Ireland program. Prerequisite: permission of the instructor. Crosslisted as EDUC 331 and/or PSYC 231.

335. Topics in Cultural Sociology (I or II; 3, 0)
Substantive examination of particular topics/themes through the lens of cultural sociology. Prerequisite: SOCI 140 and/or SOCI 212.

338. Culture and Self (I; 3, 0)
Exploration of cultural spheres/processes in the contemporary Western world within which selves/identities emerge and produce frameworks of meaning and self-consciousness. Prerequisite: SOCI 100, or SOCI 140, or SOCI 211, or SOCI 212.

340. Sociology of Religion (II; 3, 0)
Examination of the role of religion in "world-construction," social solidarity and social change; the secularization thesis; civil religion; fundamentalisms, cults, other new religious movements.

351. Field Research (AII; R; 3, 0) Half to two courses.
Independent investigation in the field; formulation of hypotheses, construction of measuring instruments, data collection, data analysis, and test of hypotheses. Prerequisite: permission of the instructor.

360. Third Sector Organizations: Nonprofits in America (I or II; 3, 0)
Nonprofit organizations, also called the third sector, make up about 10% of the American economy and they are increasingly important in terms of social policy. This course discusses organizational theory, particularly as it applies to nonprofits.

370. Senior Thesis (I or II; R; 0, 9)
Prerequisite: permission of the instructor.

372. Analyzing the Social World (II; R: 3, 0)
A course in sociological data analysis, using the General Social Survey and other data sets, promoting student research. Requires SOCI 208 or permission of the instructor.

The following Capstone courses also count toward the sociology major and minor. Each meets the 300-level or above requirement.

402. Public Service and Nonprofit Organizations (I or II; 3, 0)
Nonprofit organizations are major settings for the delivery of social services. Government increasingly is "privatising" services. Nonprofits often involve an orientation towards public service and community action. Using case studies they conduct, students explore these issues.

409. How Holocausts Happen (AII; 3, 0)
An analysis of the social and political determinants of genocidal episodes in comparative perspective. Case studies include Nazi Germany and the killing fields of Cambodia. Prerequisites: junior or senior status and permission of the instructor.

410. Remembering the Holocaust (I; 3, 0)
This course explores the Holocaust as a sociological, historical, and political event, looking at memory and remembering and representing events more than 50 years later. Not open to students who have taken SOCI 409. Prerequisites: senior status and permission of the instructor.

418. Social Services and Community: A Practicum (I; 3, 0) One to two courses.
Exploration of the practicalities of work in social service institutions through supervised field work experiences, exposure to the range of social services and careers in social work, education, law, and medicine. Prerequisite: permission of the instructor.

433. Seminar in Law and Society (II; 3, 0)
Structure and process of legal institutions: police, courts, prisons, lawyers, juries, and extralegal mechanisms relevant to the legal system. Prerequisite: permission of the instructor.

434. Seminar in Race/Ethnicity and Gender (I or II; 3, 0)
Examines how race/ethnicity and gender structure experiences, world-views, and conceptions of self and others. How larger social institutions construct race/ethnicity and gender receive attention. Prerequisite: permission of the instructor.

447. Seminar in Social Mobility: Rags to Riches in America (AI; 3, 0)
This course focuses on the myth and reality of social mobility in America during the 19th and 20th centuries. Both optimistic and pessimistic variants are considered. Special emphasis is placed on ethnic/racial differences in mobility. Prerequisites: junior or senior status and permission of the instructor.

Courses offered occasionally: 110 Social Problems, 120 American Society, 202 Social Inequality, 245 Formal Organizations, 258 Sociology of Aging, 269 Issues in the Analysis of Health Care, 316 Women and Health, 321 Sociology of Knowledge and Science, 332 Seminar in American Society

Anthropology Major (ANTH)

The anthropology major requires eight courses. A student must take ANTH 109 Cultural Anthropology; a methods course chosen from SOCI/ANTH 201 Field Research in Local Communities, ANTH 287 Anthropology in Action or SOCI 208 Methods of Social Research; ANTH 283 Anthropological Theory; ANTH 330 Advanced Seminar in Anthropology; and four electives, one of which should be an area course. After consultation with a student's adviser, one sociology course may count toward the anthropology major. No more than two off-campus courses are ordinarily counted toward the major.

The Minor in Anthropology

The minor in anthropology requires a minimum of five courses in anthropology, with no more than two courses at the 100 level. Students may not count any anthropology course toward a sociology minor nor can they count any sociology course toward an anthropology minor. The exception is when a course is listed in the *Catalog* as counting for both sociology and anthropology credit. No more than one off-campus course ordinarily counts toward the minor.

Honors

The department strongly encourages qualified majors to consider working for honors in anthropology. Such students should consult in their junior year with one or more members of the faculty of the department to begin defining a research topic and writing a proposal. Normally, during the senior year, an honors student will enroll in ANTH 319 and, if agreed to by the academic adviser, a second semester in ANTH 320. The honors proposal is to be approved by the department chairperson and submitted to the Honors Council by mid-October of the senior year. Further information can be obtained from the student's academic adviser, the department chairperson, and from the Honors Council.

109. Cultural Anthropology (I or II; 3, 0)
Nature and scope of the field: method and theory, institutions of human beings in cross-cultural perspective, case studies.

200. Urban Anthropology (I; 3, 0)
Anthropological perspective and the study of the city; problems of methodology, comparative urbanism, case studies, culture of poverty.

201. Field Research in Local Communities (I or II; 3, 0)
Participant observation, interviewing and other field research methods. Students will carry out exercises and projects in local communities. Crosslisted as SOCI 201.

227. Witchcraft and Politics (I; 3, 0)
Explores witchcraft, spirit possession, and cults of the dead as idioms of power and as vehicles for protest, resistance, and violent social change.

228. Ritual, Myth, and Meaning (II; 3, 0)
The anthropological analysis of religion and religious phenomena. Life course rituals such as birth, initiation, and death; taboo, symbolism, and the interpretation of supernatural powers.

232. Gender and Sexuality in South Asia (I or II; 3, 0)
Explores issues of gender and sexuality in South Asia, primarily India and Sri Lanka. Topics include marriage, family, life cycle, religion, and nationalism. Crosslisted as WMST 232.

235. Modern Africa (I; 3, 0)
Introduction to complexity, richness, and vitality of contemporary African cultures. Interdisciplinary perspectives on issues including economy, politics, family and community, art, literature, religion. Crosslisted as IREL 235.

244. South Asian Culture and Society (I or II; 3, 0)
An introduction to the anthropology of South Asia, especially India and Sri Lanka. Religion (Buddhism, Hinduism), social organization, politics, nationalism, gender and ethnic conflict.

245. Consumption and Material Culture (I; 3, 0)
Anthropological studies of consumption of material goods in their cultural contexts, American and Japanese studies from fast food to shopping habits. Crosslisted as EAST 245.

246. Japanese Culture and Society (I; 3, 0)
Anthropological perspective and contemporary Japan; cultural origins, variations within Japanese culture; aspects of social organization, culture, and personality. Crosslisted as EAST 246.

247. Japanese Film as Anthropology (I or II; 3, 0)
The use of Japanese film as a key to understanding both the intricacies of Japanese culture and society and the perspective of anthropology. Crosslisted as EAST 247.

249. Inside the Japanese Corporation (I or II; 3, 0)
Ethnographic approaches to the study of the Japanese corporation. A critical examination of industrial familialism, the lifetime employment system, and the work ethic. Crosslisted as EAST 249.

251. Women and Development (I or II; 3, 0)
This course examines the relationship between women and development, and an ideological economic, political, and social enterprise. Crosslisted as WMST 251.

252. Peoples and Cultures of the Andean World (II; 3, 0)
The cultural and social groups inhabiting the South American west coast in historical context; implications for anthropological and social issues concerning Third World societies.

253. Folklore and Ritual (II; 3, 0)
Survey of major approaches to folklore; sociological and psychological functions of folklore. Life cycle rituals and agrarian cycles. Slavic examples. Crosslisted as RUSS 253.

256. Native Americans, Past and Present (AI; 3, 0)
Origins, prehistoric development, historic contact, resistance and suppression of Native North Americans, and their current struggle as sovereign nations inside the United States and Canada.

260. Anthropological Perspectives on Human-Environment Relations (II; 3, 0)
Using anthropological methods and theories as a guide, this course considers the form and content of human interactions with the environment in various regions of the world.

265. Food, Eating, and Culture (I or II; 3, 0)
Social significance of food and eating. Taboos and rituals, food and identities, eating and political hierarchy, food and gender, global culture. Materialist and symbolic interpretations.

270. Sexuality and Culture (II; 3, 0)
Explores diverse cultural constructions of sexual identity, power, transformation, and taboo, and examines gender as a primary principle of social and cosmic organization.

273. Women Writing Culture (II; 3, 0)
This course explores the genre of ethnography as it has been used to examine women's lives and issues of gender around the world. Crosslisted as WMST 273.

282. Performance and Culture (I or II; 3, 0)
Interdisciplinary approaches to the study of culture and performance: dance, music, theatre, and ritual. Explores issues of embodiment, identity, gender, ethnicity, colonialism, nationalism, and globalization.

283. Interpreting Culture (I or II; 3, 0)
Explores into the major theoretical trends – both historical and contemporary – in cultural anthropology; conceptualizations of culture, society, and humankind; history and current status of the concept of culture.

287. Anthropology in Action (AI; 3, 0)
Seminar exploring how anthropology is applied to problems in health, poverty, environmental degradation, education, minority empowerment, etc. in the U.S. and Third World. Prerequisite: ANTH 109 or SOCI 100 or permission of the instructor.

319 and 320. Honors Course in Anthropology (I and II)
Each student selects a project to be developed individually. Prerequisite: permission of the department.

325 and 326. Advanced Reading in Anthropology (I or II; R; 0, 12) Half to two courses.
Readings developed around the interest of individual students. Prerequisite: permission of the instructor.

329. Religions in Africa: Spirits, Saints, and Sufis (I or II; 3, 0)
Explores the diversity of religious beliefs and practices in Africa. Religious change, syncretism, and ritual debates. Prerequisite: any anthropology course or permission of the instructor.

330. Advanced Seminar in Anthropology (I or II; 3, 0)
Focuses on selected topics of ethnographic and theoretical interest, varying from year to year. Prerequisite: ANTH 283 or permission of the instructor.

351. Field Research (AII; R; 3, 0) Half to two courses.
Independent investigation in the field; formulation of hypotheses, construction of measuring instruments, data collection, data analysis, and test of hypotheses.

410. The Environment in Cross-Cultural Perspectives (I or II; 3, 0)
Explores how particular environments come to have particular meanings – cultural and sociological, economic and political, local and global, private and public. Prerequisite: senior status.

Department of Spanish (SPAN)

Professor: Manuel Delgado

Associate Professors: Elisabeth S. Guerrero, Ana Mercedes-Patiño, Alice J. Poust (Chair)

Assistant Professors: Isabel Cuñado, Collin McKinney, Natalia Navarro-Albaladjo (visiting)

The department of Spanish at Bucknell University is committed to providing excellent instruction and learning opportunities that challenge majors and minors, and other interested students to develop their language proficiency in Spanish to the maximum, as well as to know and understand the literature and culture of the Spanish-speaking peoples of the world. We encourage our students to think critically, to question their cultural

assumptions about the Hispanic world, and to seek to immerse themselves, as much as possible, in a Spanish-speaking community.

The academic program in Spanish offers coursework in the areas of language, literature, and civilization of the Hispanic world, including Spain, Spanish-America, and the United States. The curriculum takes into account a wide variety of student needs and interests, including those of heritage students, students who plan to pursue graduate study and a career in Spanish/Hispanic studies, and those who hope to apply their language skills and cultural understanding to their chosen profession. The curriculum in Spanish encompasses three levels: first, courses focusing primarily on language acquisition, with a secondary focus on cultural competency (101 through 208). At the next level, courses introduce students with early advanced language proficiency to the breadth and diversity of the literature and cultures/civilizations of the Spanish-speaking world (220, 222, 270, 280, 285).

At the highest level, our courses provide an in-depth study of an author, period, genre, or issue in Hispanic literature or culture (295, 300 and 400-level courses).

The major in Spanish is designed to cultivate our students' understanding, respect, and appreciation of the rich literary and cultural traditions of Spanish-speaking peoples; to provide a sound foundation for graduate study related to the Hispanic worlds; and to develop our students' ability to analyze critically literary and cultural works in Spanish.

Through their coursework in the major, students are introduced to the discipline of Hispanic letters, and also explore connections between Spanish and other disciplines in the humanities or in the social sciences. The on-campus curriculum, combined with a semester or year of study abroad on Bucknell *en España* in Spain or on a program approved by the department for Spanish-America, will enable students to reach an advanced level of proficiency in listening comprehension, speaking, reading, and writing in Spanish. The language proficiency attained by our students, along with the cultural understanding they gain through their studies at Bucknell and abroad, will allow them to interact effectively with Spanish-speaking peoples throughout the world. By relating to Hispanic cultures, our students increase their own self-awareness and their sense of connectedness to a diverse world.

Students may set out to accomplish the goals outlined for the major by taking up to three language courses beyond the Intermediate-I level: SPAN 105 Intermediate Spanish II, SPAN 207 Grammar, Conversation, Composition in Spanish, and SPAN 208 Advanced Conversation and Composition in Spanish. SPAN 208 is a prerequisite for courses numbered 220 and beyond. After taking the appropriate language courses, students gain an understanding of Hispanic literary and cultural traditions by enrolling in courses that provide an overview of literature and culture/civilization: SPAN 220 Introduction to Spanish Literature, SPAN 222 Introduction to Spanish-American Literature, and SPAN 285 Latino-Latina Literature; SPAN 270 Spanish Civilization and SPAN 280 Spanish-American Civilization, or SPAN 295 Topics in Spanish a course that focuses on a particular topic, author, or genre in literature or culture. In order to achieve a high level of language proficiency and cultural understanding, it is strongly recommended that students majoring in Spanish spend at least one semester of their junior year on Bucknell *en España* in Spain, or on one of the approved programs for Argentina, Chile, the Dominican Republic, Ecuador, or Mexico. After taking courses that provide them with a sense of Hispanic literary and cultural traditions, either at Bucknell or on an approved study abroad program, students

complete the major with two or more advanced courses or seminars, offering an in-depth study of particular aspects of Hispanic literature and culture. These courses, numbered in the 300s or 400s, are often related to the professor's area of expertise and normally require that students participate actively in class discussion, make formal presentations in class, and that they write a research paper in Spanish. During the senior year, Spanish majors also will present a portfolio documenting their progress toward the goals articulated by the Spanish department as part of the department's assessment procedures.

A **major** in Spanish requires at least eight credits above SPAN 103 Intermediate Spanish I. Four of these credits, or courses, must be taken at Bucknell. Only one course from Spanish department offerings taught in English may be counted toward the major.

The requirements for the major include the following:

SPAN 208 (unless the placement test demonstrates proficiency beyond this level).

At least three courses at the 200-level beyond SPAN 208, including:
One course in literature (SPAN 220, SPAN 222, or SPAN 285)*
One course in culture/civilization (SPAN 270 or SPAN 280)*
One course in literature or civilization to be selected from Spanish department offerings numbered 200 to and including 295*

Students must take two courses at the 200-level (beyond 208) before enrolling in a 300-level course.

At least two courses at the 300 or 400 level, taken at Bucknell.

* The Spanish department strongly recommends that students take at least one of these courses at Bucknell before studying abroad. Students who plan study abroad during a semester or year in a Spanish-speaking country may meet these requirements by taking comparable courses on a study program approved by the Spanish department. Students must consult in advance with their adviser in Spanish or, if they do not yet have an adviser, with the Spanish department chair, to ensure that they take courses abroad that meet the requirements listed above for the 200-level.

One of the following courses given in English may be counted once toward the major: SPAN 250 Hispanic Literature in Translation; SPAN 331 Spanish Comedia and Shakespeare; SPAN 362 Topics in Hispanic Literature if cross-listed with a course given in English. Otherwise, the medium of instruction must be Spanish in all courses credited toward the major.

A student seeking certification to teach Spanish in elementary or secondary school must complete the major in Spanish, as well as the requirements formulated by Bucknell's education department, in accordance with the guidelines of the Commonwealth of Pennsylvania. Students who wish to be certified to teach Spanish should consult with the Spanish department chair early in their university career.

Students who are considering a Spanish major should plan to take at least one course in Spanish each semester at Bucknell, if possible. This will ensure that their gains in language proficiency, in particular, will be sustained during one's four-year program.

Study abroad
Residence abroad in a Spanish-speaking country is the best way to gain the language proficiency and the knowledge of Hispanic literature and cultures expected for the major.

Students are strongly urged to study abroad on a program approved by the Spanish department for its majors and minors. Only courses taken on these programs may be counted toward the major and minor. At least one of the courses taken abroad for credit toward the Spanish major must deal with literature. Approved programs may change from year to year.

Study in Spain: The University's Bucknell *en España* provides a study abroad experience designed to meet the educational needs of Spanish majors, minors, and other Bucknell students who have taken SPAN 105, or have reached the equivalent level, and who wish to study in Spain. The program is centered at the Universidad de Granada in Granada, Spain. Students who wish to study in Spain but who are not sufficiently advanced for Bucknell *en España* may go on the CIEE program at the Universidad de Alicante.

Study in Spanish-America: For majors and minors, the Spanish department has approved study abroad programs in Argentina, Chile, Ecuador, the Dominican Republic, and Mexico. Students should consult with their advisers in Spanish, the Spanish department chair, or the Office of International Education regarding these programs.

Honors: Majors with a strong academic record and interest in research are encouraged to speak with a faculty member in Spanish about an honors project in their sophomore or junior year.

The **minor** in Spanish consists of five courses beyond SPAN 103 Intermediate Spanish I. At least two of the courses for the minor must deal with literature or civilization and at least three of the courses counted for the minor must be taken at Bucknell. Students who go on the Bucknell *en España* program and plan to minor in Spanish need to take two courses on campus.

101 and 102. Elementary Spanish I and II (I and II; 5, 0)
Beginning language skills (Levels 1 and 2). Practice in listening, speaking, reading, and writing; elementary grammar; introduction to Hispanic culture. SPAN 101 is prerequisite to SPAN 102.

101A. Accelerated Elementary Spanish (II; 5, 0)
Review of basic language skills for students who have studied one or two years of Spanish in secondary school. Prerequisite: one to two years of high school Spanish.

103. Intermediate Spanish I (II; 4, 0)
Continuation of all four language skills (Level 3); review of grammar; some readings in literature and culture. Prerequisites: three years of high school Spanish or SPAN 102 or equivalent is prerequisite to 103.

105. Intermediate Spanish II (I and II; 3-4, 0)
Continuation of intermediate language skills (Level 4). Prerequisite: four years of college-preparatory Spanish or equivalent. Open to students who have had SPAN 103. Not open to students who have had SPAN 104.

207. Grammar, Composition, and Conversation (I or II; 3, 0)
Intensive practice in writing and speaking Spanish. Prerequisite: SPAN 105 or equivalent.

208. Advanced Conversation and Composition (I or II; 3, 0)
Advanced study and practice in the Spanish language to enhance oral and written proficiency. The reading of texts from a variety of sources, which can include news articles, essays, and literary texts, will serve as a point of departure for class discussion and written assignments.

220. Spanish Literature (I, II; 3, 0)
An introduction to landmark works of Spanish literature across major artistic and cultural periods, such as the Medieval, Renaissance, Baroque, and the Modern. The course will include an overview of fundamental cultural attitudes and beliefs that have informed Spanish society throughout history. In Spanish.

222. Spanish American Literature (I, II; 3, 0)
An introduction to the broad range of authors, topics and genres that constitute the literary tradition of Spanish-America. The course is designed to provide students with a foundation for more specialized study in Spanish American literature. In Spanish.

245. Vida y Cultura en España (I or II; 3, 0)
Guides students in their experience of life and culture in Spain and fosters their reflection on the cross-cultural learning experience. Prerequisite: SPAN 105 or equivalent. Only given in the Bucknell *en España* program.

270. Spanish Civilization (I, II; 3, 0)
An introduction to the civilization and culture of Spain through the study of art, history, literature, and film. In Spanish.

280. Spanish American Civilization (I or II; 3, 0)
An introduction to the civilization and cultures of Spanish-America through the study of art, history, literature, and film. In Spanish.

285. Latino/Latina Literature in the U. S. (I or II; 3, 0)
This course will discuss issues of cultural identity within the literary production of Hispanics living in the U.S. (some film included). In Spanish. Prerequisite: SPAN 208.

290. Independent Study (I or II: R)
Subject to be selected by student in consultation with the instructor. Prerequisite: permission of the instructor.

295. Topics in Spanish (I or II; R; 3, 0)
Given in Spanish, this course will deal with different aspects of the language, literature, or civilization of the Spanish-speaking peoples.

310. Advanced Topics in Spanish Language (I or II; R; 3, 0)
This course will provide study of the Spanish language for very advanced students. It will emphasize oral and written communication functions. In Spanish.

322. Modern Spanish Literature (I or II; R; 3, 0)
Spanish literature of the 19th and 20th centuries. This course will be devoted to a different major author, movement, or genre each time it is given. In Spanish.

323. Topics in Spanish American Short Story (I; 3, 0)
Focuses on the art and the theory of the short story in Spanish-America. This course will be devoted to different authors or a different set of readings each time it is given. In Spanish.

324. Twentieth-century Spanish American Literature (I or II; R; 3, 0)
This course will be devoted to a different major author, movement, or genre each time it is given. In Spanish.

325. Post-war Spanish Novel and Film (I or II; 3, 0)
This course examines the memory of the Spanish Civil War in the narrative and films from the 1940s to the present. Selected works include novels and short stories by Rodoreda, Laforet, Cercas, Marias, and Rivas; and films by Erice, Loach, Saura, and Cuerda. Prerequisite: two courses at 200-level beyond SPAN 208.

326. Spanish Literature and Society of the 19th century (I or II; R; 3, 0)
Devoted to the major authors of the 19th century –Bécquer, Galdós, Clarin, Pardo Bazán – this course will cover a different topic and set of readings each time it is given. Possible topics include: science and literature, masculinity, text and image. Prerequisites: two 200-level course numbered 208 or higher.

334. García Lorca, Salvador Dalí, and Luis Buñuel (I or II; 3, 0)
This course presents the works of three of the best known artists of 20th-century Spain – Lorca, Dalí, and Buñuel – who will be studied in the context of cultural and intellectual issues treated in the intersecting realms of literature, film, and painting. In Spanish.

335. Spanish Drama Workshop (I or II; 3, 0)
This course features the study of the so-called "theater of liberation," the theater that seeks social, political, and religious freedom, as well as the "theater of democracy," written after 1975. Students will present scenes from the plays studied in class. In Spanish.

338. Goya and the Drama of His Times (I or II; 3, 0)
This course will draw on the intersecting disciplines of art, drama, history, and film to provide a comprehensive picture of the social and political context of the Spain of Francisco de Goya (18th and 19th centuries). Reference also will be made to the 20th-century Civil War and Franco periods. In Spanish. Crosslisted as SPAN 424.

346. Utopia/Dystopia in Urban Latin America (I or II; 3, 0)
This interdisciplinary course explores cities of Latin America through the lens of utopia and dystopia. Sources of inquiry include film, architecture, art, fiction, poetry, and readings in history, politics, economics, and environmental studies. Crosslisted as SPAN 446.

347. Historical Consciousness in Argentine Literature (I or II; 3, 0)
Examines the portrayal of Argentine history in contemporary literature of Argentine. Prerequisite: SPAN 208.

348. Gender in Twentieth-century Spanish-American Literature (I or II; 3, 0)
Examines the construction of gender in selected works by Spanish-American and Latino-Latina writers of the 20th and early 21st centuries. Prerequisites: two courses at 200-level numbered 208 or higher.

361 and 362. Topics in Hispanic Literature (I or II; R; 3, 0)
These courses will deal with topics in Spanish or Spanish-American literature on an advanced level. In Spanish. SPAN 362 may be counted once toward the major when it is crosslisted with courses in English; otherwise, it may be repeated.

364. Topics in Spanish Civilization (I or II; R; 3, 0)
This course will deal with different topics in the civilization of Spain on an advanced level. In Spanish.

366. Mexican Revolution: Literature and Art (I or II; 3, 0)
This course charts the creation of a national identity, exploring literature and visual arts that depict the massive social changes brought about by the Mexican Revolution. In Spanish. Prerequisite: junior or senior status. Crosslisted as SPAN 466.

390. Independent Study (I or II; R)
Subject to be selected by student in consultation with the instructor. Prerequisite: permission of the instructor.

399. Honors Course in Spanish (I or II; R)
For selected seniors, who will be supervised in individual work. Prerequisite: permission of the instructor.

410. Advanced Topics in Spanish Language (I or II; 3, 0)
Varied readings and discussions of the Spanish language which will increase language proficiency and a cultural understanding of the Hispanic world. Prerequisite: SPAN 208.

423. García Lorca, Salvador Dalí, and Luis Buñuel (I; 3, 0)
Students will study the theater of Federico García Lorca, the paintings of Salvador Dalí and the film production of Luis Buñuel. Crosslisted as SPAN 334.

424. Goya and the Drama of His Times (I or II; 3, 0)
This course will draw on the intersecting disciplines of art, drama, history, and film to provide a comprehensive picture of the social and political context of the Spain of Francisco de Goya (18th and 19th centuries). Reference also will be made to the 20th-century Civil War and Franco periods. In Spanish. Crosslisted as SPAN 338.

446. Utopia/Dystopia in Urban Latin America (I or II; 3, 0)
This interdisciplinary course explores cities of Latin America through the lens of utopia and dystopia. Sources of inquiry include film, architecture, art, fiction, poetry, and readings in history, politics, economics, and environmental studies. Crosslisted as SPAN 346.

461 and 462. Topics in Hispanic Literature (I or II; R; 3, 0)
These courses will deal with different topics in Spanish or Spanish-American literature on a Capstone level. In Spanish.

464. Topics in Spanish Civilization (I or II; R; 3, 0)
This course will deal with different topics in the civilization of Spain on a Capstone level. In Spanish.

465. Topics in Spanish American Civilization (I or II; R; 3, 0)
This course will deal with different topics in the civilization of Spanish-America on a Capstone level. In Spanish.

466. Mexican Revolution: Literature and Art (I or II; 3, 0)
This course charts the creation of a national identity, exploring literature and visual arts that depict the massive social changes brought about by the Mexican Revolution. In Spanish. Prerequisite: junior or senior status. Crosslisted as SPAN 366.

Courses offered occasionally: 240 Vida y Cultura en Granada, 250 Hispanic Literature in Translation, 264 Hispanic Topics, 331 Spanish Comedia and Shakespeare, 351 Women's Writing in the Hispanic World, 353 Intercultural Communication: The Anglo-Hispanic Connection, 360 Literature and Film of the Hispanic World, 365 Topics in Spanish-American Civilization, 375 Magical Realism and the Fantastic

Theatre and Dance

Professor: F. Elaine Williams

Associate Professors: Robert Gainer (Chair), Gary M. Grant, Er-dong Hu

Assistant Professors: Paula Davis-Larson, Kelly Knox

Lighting Design/Technical Director: Heath J. Hansum

Theatre Program (THEA)

The study and practice of theatre gives liberal arts students a deeper understanding of themselves and their world. They can awaken and discover their own creative impulses and imagination by inhabiting the poetic forms of other cultures, and they can develop an understanding of multiple perspectives by exploring the unique visions of theatre artists. The study and practice of theatre develops expertise in creative and collaborative problem solving, in visual and kinetic literacy, and in oral communication.

The **major** in theatre offers opportunities in all phases of theatre arts and consists of a minimum of eight and one-half course credits.

Required of all majors:

- History and Theory: THEA 256 Rituals, Festivals, Institutions and THEA 259 The Rise of Theatrical Realism
- Performance (choose one): THEA 110 Acting I, THEA 220 Acting II, or THEA 249 Mask and Makeup Design
- Design (choose one): THEA 246 Scene Design, THEA 248 Theatrical Lighting Design, THEA 249 Mask and Makeup Design, THEA 251 Costume Design
- Dramatic Literature and Criticism (choose one): THEA 258 Modernism in Performance, THEA 261 Sam Shepard and American Theatre, CLAS 223 Ancient Laughter, ENGL 257 Shakespeare, RUSS 265 Russian Theatre of the 19th and 20th Centuries
- 300-level Seminars and Projects (choose two): THEA 314 Seminar in Contemporary Scenography, THEA 319 Individual Projects, THEA 393 Seminar in Avant-Garde Performance, THEA 397 Seminar in Special Topics, ENGL 358 Seminar in Shakespeare
- One additional THEA or DANC course in performance, design, or dramatic literature and criticism
- Half-credit of THEA 101 Technical Theatre Practicum and/or THEA 102 Theatrical Rehearsal and Performance

Students pursuing a concentration in acting, directing, design, or dramaturgy/ playwriting will be advised to select additional courses in related areas (dance, art, music, philosophy, etc.) as electives in addition to the advanced performance, design, or theory courses. A suggested guideline for each concentration is available from your adviser. Faculty advisers will carefully develop a course of study with students to meet their individual needs and educational goals. Students majoring in theatre are expected to participate in the work of the department of theatre and dance production program. Students may register for one quarter credit in THEA 101, THEA 102, or THEA 103 for active participation in designated areas of technology or performance. A maximum of one-half credit is permitted per semester and there is a limit of two full course credits in all. Faculty will supervise student participation, provide instruction, and approve the awarding of credit.

The minor in theatre is for liberal arts students who wish to broaden their experience with the theatre arts.

Three **minors** are offered by the department:

- the Acting and Directing minor requires a minimum of five and one-half credits including THEA 256 or THEA 259, three electives in performance (one of which may be THEA 240 or THEA 249), one 300-level theatre course, THEA 102 (quarter credit) and/or THEA 103 (quarter credit).
- the Design and Technology minor requires a minimum of five and one-half credits including THEA 256 or THEA 259, three electives in design and technology (one of which may be THEA 250), THEA 314, and two sections of THEA 101 (quarter credit).
- The General Theatre minor requires a minimum of five and one-half credits, including THEA 256 or THEA 259, one performance course, one design or technology course, one 200-level elective, THEA 314 or THEA 393, and two sections of THEA 101 and/or THEA 102, and/or THEA 103.

Honors in Theatre
A program leading to a major with honors in theatre may be proposed by the student in consultation with the department chair and appropriate department faculty. The student generally undertakes a specifically designed sequence of courses, independent research, and creative projects culminating in the stage direction or design of a mainstage production, the writing of a playscript, a performance project, or a research paper in the area of theatre history, criticism, or dramatic literature.

101. Technical Theatre Practicum (I and II; R; 0, 2.5)
Quarter-course credit for supervised participation in any one of several aspects of theatrical production of the department of theatre and dance's major productions. Prerequisite: permission of the instructor.

102. Theatrical Rehearsal and Performance (I and II; R; 0, 4) Quarter course.
Quarter-course credit for substantial participation in a major theatrical production; for example, as actor, stage manager, vocal coach, choreographer. Prerequisite: permission of the instructor.

103. Audition Technique (I; R; 0, 3) Quarter course.
Working on monologues as a form for the auditioning actor. This study culminates in actual presentations for graduate school and/or conservatory auditions. Prerequisites: seniors only and permission of instructor.

110. Acting I (I and II; 4, 0)
Introduction to acting: a critical approach to drama and personal expression, including physical, vocal, and interpretive aspects of performance. Prerequisite: seniors by permission only.

149. Introduction to the Theatre (I and II; 3, 0)
Introductory study of theatre (playwriting, directing, acting, design, criticism); stresses the elements of drama, their interaction, and their realization in theatrical production.

220. Acting II (II; 4, 0)
Application of technique and improvisation to the performance of scenes, with emphasis on characterization and textual analysis. Prerequisite: THEA 110 or permission of the instructor.

230. Acting Styles (AI; 4, 0)
Exploring styles of acting in plays from different periods, including Greek and Shakespearean tragedy and Comedy of Manners. Prerequisite: THEA 110 or THEA 220 or permission of the instructor.

240. Directing the Play (II; 3, 0)
The critical and creative responsibilities of the director; the principles of directing and their application. Prerequisite: THEA 110 or THEA 220 or permission of the instructor.

245. Entertainment Technology (I or II; 3, 2)
From sawdust to soundboards, this course focuses on today's technical stage environment, including scenery construction, lighting, sound systems, and rigging for theatre, dance, and music concerts.

246. Scene Design (I; 3, 0)
Creating an environment for the action. Through selected projects, students explore how to convey mood and character, indicate time and place, and how to reinforce theme through the visual environment. Emphasis in this introductory class is on learning effective play analysis, period research, and how to express important themes and characterization visually. Students develop drawing, drafting and model building skills.

247. Visual Style (II; 3, 0)
This scenography course explores the visual art/theatre movements that have shaped contemporary design in theory and practice. Students who have taken scene, costume, or lighting design collaborate as designers on group projects or plays inspired by visual styles such as the decorative style of Ballets Russes, the New Stagecraft movement, the theatre of the Bauhaus, and experiments in actor/audience relationships. Prerequisite: THEA 246, THEA 248 or THEA 251.

248. Theatrical Lighting Design (II; 3, 2)
An introduction to and practice in theatrical stage lighting. Primary emphasis in aesthetics and function of light in design.

249. Mask and Makeup Design (AI; 3, 0)
The study of stage makeup (including corrective and character) progresses to the design of makeup as mask and then to the design of three-dimensional masks for performance. Our study emphasizes the ways that the performance, ritual, and festival traditions of the

Americas, Africa, Asia, Europe, and Oceania have influenced present performance styles in theatre and dance.

250. Costume and Fashion (AI or II; 3, 0)
An overview of the history of costume from the Egyptian period to the present; stresses fashion as the mirror of the attitudes of each age.

251. Costume Design (AI or II; 3, 1)
Introduction to design of clothing for the stage; emphasis on character analysis and design for plays in different styles and periods.

252. Sound Design (I; 3, 2)
This course is directed at students with limited experience in sound design. The course will explore both theoretical and practical aspects of audio mixing and reinforcement.

254. Computer-Aided Design for the Stage (I; R; 3, 1)
An introduction to CAD for use in theatre and other entertainment venues. Includes basic CAD training in technical drafting, scenic modeling and lighting design.

255. The Art of Costume Craft (I or II; 2, 3)
Use creativity and imagination in the studio to explore the sculptural and expressive nature of costume design as art.

256. Rituals, Festivals, Institutions (I; 3, 0)
Investigates various theories concerning the origins of Western theatre in ritual performance and explores the development of theatrical institutions from the Greeks to Shakespeare in the context of social, philosophical, and religious values.

258. Modernism in Performance
Addresses the diversity of dramatic styles and thematic interests of modernist playwrights: Buchner, Ibsen, Brecht, Beckett, and Handke; emphasizes historical context and analysis of production values.

259. The Rise of Theatrical Realism (AI; 3, 0)
Surveys the complexity of theatrical process as part of the history of ideas by focusing on the development of "realism" as a cultural institution in various European capitals from the court celebrations of Stuart London to the off-off Broadway movement in New York City.

261. Inner Journey: Sam Shepard and American Theatre (AI; 3, 1)
Sam Shepard has his finger on the pulse of post-modern America. This study of his plays and films charts the transformation of his dramatic style, from absurdism through jazz and rock 'n' roll to realism, and explores the profound changes in Shepard's vision of the theatre and American culture.

264. Theatre in London (I; 2, 3)
Theatrical productions on the contemporary London stage studied through attendance at performances, script analyses, and discussions with actors, directors, designers, and production personnel. Prerequisites: enrollment in Bucknell in London program and permission of the instructor.

265. Special Studies in Theatre (I or II; R; 3, 0)
In appropriate years, special topics such as stage combat, mime, or theatrical criticism will be studied.

314. Seminar in Contemporary Scenography (AII; 3, 0)
The seminar explores the 20th-century visual art, theatre, and dance movements that have exerted a pervasive influence on contemporary stage practice. Emphasis is placed on relating contemporary performance styles and the design of stage-spectator spaces, costumes, and lighting to their antecedents.

319. Individual Projects (I and II; R)
Individual, special projects supervised by instructor; honors thesis.

393. Seminar in Avant-Garde Performance (AI or II; R; 3, 0)
This study of experimental aesthetics traces the development of a new paradigm for 20th-century "multi-media" art forms and the aesthetics of "total theatre." The course explores thematic topics such as The Theatre of Social Change, The Self as Content, Theatre and Therapy, The Poor Theatre, Environmental and Formalist Experiments, Happenings and Performance Art.

397. Seminar in Special Topics (I or II; R; 3, 0)
Particular theatre topics selected by the instructor.

Course offered occasionally: 215 Introduction to Movement

Dance Minor (DANC)

The six-credit program for an academic minor in dance is designed to provide a wide perspective and broad foundation for technical and theoretical experience for the development of disciplined, insightful artists. The minor acknowledges ongoing studio training in a variety of dance styles with experience in repertory and performance, as well as theoretical reinforcement through courses in dance history and composition. Repertory classes and guest-artist residencies provide opportunities to learn classic reconstructions, vital new choreographies, and cultural forms. Participation in the various dance productions is expected; furthermore, cross-disciplinary course work in costume, lighting, scenic and sound design is encouraged.

Performance: Students minoring in dance are expected to perform in one or more of several venues. They might perform in the Bucknell Dance Company, the Choreographer's Showcase, or the Studio Dance Concert. Performance and choreographic opportunities include mainstage, studio, and environmental concerts in the Harvey Powers Theatre, Weis Center for the Performing Arts, Tustin Blackbox Theatre, and other alternative spaces. Quarter-course repeatable credit in DANCE 360 reflects significant faculty directed involvement in the Bucknell Dance Company; a maximum of one-quarter credit is permitted per semester.

The **minor** in dance is structured as follows:

Theory Requirements (three course credits):

DANC 250	History of Dance	full credit
DANC 262	Dance Composition	full credit

And an additional course focusing on a related element of dance including:

DANC 215	Introduction to Movement	full credit
THEA 246	Scene Design	full credit
THEA 248	Lighting Design	full credit
THEA 251	Costume Design	full credit
CAPS 4xx	when approved by the department	

Technique Requirements (three course credits total):

Students are required to complete at least one semester of each of the following:

DANC 310	Modern Dance Technique II	half credit
DANC 325	Ballet Technique II	half credit

And at least one approved alternative dance technique incorporating a diverse understanding of styles and cultures including:

DANC 230	Jazz Technique I	half credit
DANC 265	Dance of Eastern Europe	half credit
DANC 275	Dance Conditioning	half credit
DANC 300	Chinese Dance Technique	half credit
DANC 330	Jazz Technique II	half credit

Additional elective courses offered (to fulfill the three credit requirement) include:

DANC 210	Modern Technique I	half credit
DANC 225	Ballet Technique I	half credit
DANC 263	Repertory	half credit
DANC 350	Ballet Technique III	half credit
DANC 355	Pointe and Variations	half credit
DANC 360	Rehearsal and Performance	half credit

All technique and performance courses are repeatable in recognition of the importance of consistent individualized training at the appropriate level within different styles of dance.

210. Modern Dance Technique I (I and II; R; 0, 3) Half course.
Introduction to the technical skills and artistic philosophy of modern dance; dance movement vocabulary includes basic floorwork, axial and locomotor patterns, and movement combinations.

225. Ballet Technique I (I and II; R; 0, 3) Half course.
A course designed to build the strength, flexibility, and control necessary for performance of classical ballet technique at the beginning/low intermediate level.

230. Jazz Dance Technique I (I and II; R; 0, 3) Half course.
Designed to provide training and experience in the technique of jazz dance while placing the art form in its historical context as an American vernacular form.

250. History of Dance (II; 3, 0)
A study of the forms of dance both as reflective of cultural history and as an art form from primitive times to the present.

262. Dance Composition (I; 3, 2)
Introduction to the basic techniques and underlying principles of the craft and art of choreography; practical experience in structuring solo and group choreography.

263. Repertory: World Dance (I or II; R, 0, 3) Half course.
A course designed to provide advanced dance technique, performance theory, and repertory selections from a specific dance style or ethnic form. Prerequisite: permission of the instructor.

265. Dance of Eastern Europe (II; R; 0, 2) Half course.
Studio-based course to introduce dances of Eastern Europe that reflect the diversity of the region.

275. Dance Conditioning (I or II; 1.5, 1.5) Half course.
A lecture/laboratory course exploring the theory and practice of mind-body integrative techniques, such as Pilates, Yoga, Floorbarre, and Massage to promote strength and flexibility.

300. Chinese Dance (AI; R; 0, 3) Half course.
Studio training in the classical and folk dance forms of China, including Chinese traditional dance and specialized props, such as long-sleeves, fans, and ribbons.

310. Modern Dance Technique II (I and/or II; R; 0, 3) Half course.
A continuation of DANC 210 with emphasis on advanced technical skills, expressive style, and performance elements.

315. Modern Dance Technique III (I or II; R; 0, 3) Half course.
An advanced level modern course with emphasis on honing technical skills, expressive style and performance elements.

325. Ballet Technique II (I and/or II; R; 0, 3) Half course.
A continuation of DANC 225 with emphasis on advanced technical skills and performance aesthetics.

330. Jazz Dance Technique II (I and/or II; R; 0, 3) Half course.
A continuation of DANC 230 with emphasis on advanced technical skills and historical style; jazz repertory and compositional work included.

350. Ballet Technique III (AI or II; R; 0, 3: U) Half course.
An advanced-level course designed to aid the student in the application and refinement of technical skills, French terminology, and artistic philosophy of classical ballet.

355. Pointe and Variations (I and II; R; 0, 2) Half course.
The application of already acquired technical skills of classical ballet to work performed in pointe shoes will be explored incorporating the development of kinesthetic and aesthetic awareness.

360. Rehearsal and Performance (I and II; R; 0, 4) Quarter course.
Quarter-course credit for substantial participation in dance production, touring, or residency.

Course offered occasionally: 215 Introduction to Movement

University Courses (UNIV)

Coordinator: Robert M. Midkiff Jr.

The Council on University Courses was formed by action of the faculty and has the responsibility for authorizing and coordinating various courses on issues of an

interdisciplinary and crossdepartmental character. There are two types of courses: University Colloquia and University Courses.

University Colloquia
As the term implies, these are designed for full participation by all members of the class in the analysis and criticism of the issues selected for the course. To facilitate and to encourage such participation, colloquia are normally limited in size to 15 students and meet once a week for three hours. The emphasis is on mutual and rational discourse.

Colloquia concern issues that require the cooperative interplay of more than a single discipline of study or the speculative transcending of ordinary disciplinary lines.

Some colloquia are planned for first-year students, and others projected for upperclass students. Furthermore, prerequisites or a certain grade point average may be required for participation in a specified colloquium, given its particular focus, objectives, or materials.

University Courses
These are intended to provide an opportunity to examine problems, programs of research, plans of study, and methods of learning that may not be wholly appropriate in existing departmental curricula. Thus, University Courses are interdisciplinary and cross-departmental in character. Normally University Courses are open as to size, as well as method of instruction, and meeting times.

University Courses may be limited to first-year or upperclass students. Prerequisites for admission may or may not be designated depending upon the objectives of the particular course. The courses may be taught by one or more instructors.

1NT. Internship Credit (I, II, S) Quarter credit.
Partial credit for non-paid internship experiences. Requires submission of proposal to the UNIV 1NT coordinator and approval of proposal prior to enrollment. May only be repeated once for a total of .5 credits. Prerequisite: permission of the coordinator.

222. An Examination of the Daily Press in the U.S. (I; 3, 0)
A practical methods course that examines the broad range of coverage of daily newspapers – from international news to sports – and establishes criteria of journalistic excellence.

228. Legal and Ethical Issues of the Press (I; 3, 0)
A course on the press that focuses on more theoretical concerns, for example, First Amendment interpretations, libel, ethical issues, influences on the press and by the press. Prerequisite: permission of the instructor.

229. Introduction to American Studies (I; 3, 0)
This course introduces the interdisciplinary field of American studies, emphasizing key texts and methods for understanding American culture, values, peoples, and issues. Crosslisted as GEOG 229.

232. Peace and Society (I or II; 3, 0)
Interdisciplinary course on peace, conflict and society. Topics include violence and masculinity, the psychology of killing, ethnic conflict, genocide, nonviolent political action, peace movements, and religion and nonviolence.

233. The Philosophy of Peace and Nonviolence (I or II; 3, 0)
A course in peace studies that will investigate the arguments and spirit of Pacifism and nonviolent philosophies. Crosslisted as PHIL 233.

239. Working with Writers: Theory and Practice (I or II; 3, 0)
An exploration of the social and intellectual dynamics of the writing and tutoring process.

242. Food and Society (AI or II; 3, 0)
This course explores the impact that technologically driven changes in food production and distribution are having on individuals, communities, cultures, and the environment.

243. Form and Function: Design in the Natural and Fabricated Worlds (I or II; 3, 0)
An exploration of the relationship between the technical and the social, historical, and aesthetic aspects of design. Open only to students enrolled in the Bucknell in London program.

245. AIDS (I; 3, 0)
AIDS, its historical, scientific, social, political contexts, will be the topics of the course. Faculty from many departments will be involved.

252. Political Economy of Global Resources (I or II; 3,0)
A study of environmental and energy economics in the context of global resources and politics. The theme of sustainable development will be linked to the new realities of international relations. Prerequisite: ECON 103. Crosslisted as ECON 252 and IREL 252.

255. Film Experience: Intro to Cinema (S; 2, 2)
Tracing the film history from 1896 to the present, the course approaches cinema as art and discusses major elements of film and its genres.

258. Star Power: Hollywood Films – 1920s –1950 (I, II, or S; 3, 2)
The course examines the role of acting in Hollywood cinema during its Golden Age. It discusses such issues as "film stardom", acting in the film, "genre acting", etc.

259. Entertaining the Nazis: German Film in the Third Reich (I or II; 3, 2)
Analysis of films as political, cultural, and social texts. Course emphasizes the study of film as a medium that has the power to disseminate propaganda and to invite subversion.

261. Nazi Culture (I; 3, 0)
A study of Nazi attitudes towards the arts, science, education, mass media, work, morality, sex, war, and religion. In English. Crosslisted as GRMN 261.

270. Technical Prospectives: Life, the Universe, and Engineering (I or II; 4, 0)
Technical and critical evaluation of issues in our society using principles of mass and energy conservation and engineering design methodology. Issues may include: global warming, disposal of hazardous waste, product advertisements, pharmaceutical development and testing, product manufacturing, successes and failures. Crosslisted as ENGR 270.

271. Art, Religion, Politics in Tudor England (I or II; 3, 0)
Course examines how Tudor monarchs used public and religious art and architecture to discredit their predecessors' policies and to propagandize and consolidate their policies. Prerequisite: Open only to students enrolled in the Bucknell in London program.

274. Studies in London (I; 3, 0)
A seminar that integrates the varied aspects of a given semester's Bucknell in London program, normally required of all students in that program. Content and subtitle vary from year to year. Open only to current London program participants.

276. Markets, Metrics, and Mavens (I; 3, 0)
This course spans developments in science and economics from the 18th century into the 21st century. May be crosslisted as ECON 222. Open only to students enrolled in the Bucknell in London program.

279. Darwin's Dangerous Idea (I; 3, 0)
Darwin's theory of evolution, its historical and social context, scientific development, cultural impact, and differences in perceptions of evolutionary theory between the U.S. and Europe. Prerequisite: permission of the instructor. May be crosslisted as BIOL 319.

285. Professional Ethics (II; 3, 0)
For students contemplating professional careers in engineering, law, or medicine. Basics of professional ethics, morals, and law. Professionalism, risk and safety, social responsibility, obedience, loyalty, deception and fraud.

339. Working with Writers Practicum (I or II; 1-2) Half course.
A further exploration of the social and intellectual dynamics of the writing and tutoring process, with supervised practice and critical reflection. Prerequisite: UNIV 239 or permission of the instructor.

Courses offered occasionally: 215 Aging: Person and Society, 219 Peace Studies, 220 Rhetoric of War and Peace, 223 Editing for Careers in Publishing, 246 Genetics, Identity and Value, 265 The Human Side of Construction, 272 Multicultural U.S.A., 281 Integrating Science, 310 Systems Thinking and Modeling, 315 Waging War on Wall Street, 320 Sociotechnology, 335 Practicing Democracy: Active Citizenship, Community Engagement, and Social Change

Women's and Gender Studies Program(WMST)

Director: Glynis Carr

Assistant Professors: Coralynn Val Davis, Susan A. Reed

Advisory Board: Nina Banks, Glynis Carr, Coralynn Davis, Mara DeGennaro, Bill Flack, Ghislaine McDayter, Karline McLain, Harriet Pollack, Susan Reed, Ann Tlusty, Joel Wade

Women's and gender studies is distinguished by its interdisciplinary nature. The two central goals of women's and gender studies at Bucknell University are the examination of history, society, science, and culture from feminist theoretical perspectives, and the strengthening of analytical thinking and inquiry through special attention to women's experiences, the construction of femininity and masculinity, the relations between women and men, and the differential power structures that create these social categories. The major and minor in women's and gender studies are designed to provide the breadth of exposure, critical perspective, and research tools necessary for understanding the social construction of gender in its relation to race, ethnicity, class, sexuality, disability, and age both in the past and present. The program of study frames questions of gender and feminisms in ways that connect the local to the global and promote an understanding of the relations of power among nations and cultural constituencies.

A major in women's and gender studies at Bucknell may provide the first stage for graduate work in a number of disciplines. (Some departments at Bucknell offer courses at the graduate level in women's and gender studies.) It also offers a background for careers in local and state agencies addressing the needs of girls and women, and in fields such as journalism, law, international affairs, teaching, public and private corporations, and personnel management.

The minimum requirement for a **major** in women's and gender studies is eight courses. Students majoring in women's and gender studies must distribute their courses as follows:

- One of the following:
  WMST 140 Introduction to Women's and Gender Studies (may be crosslisted as ENGL 140)
  WMST 150 Introduction to Women's and Gender Studies
- WMST 220 Introduction to Feminist Thought
- One of the following:

ANTH 232	Gender and Sexuality in South Asia
ANTH 270	Sexuality and Culture
ANTH 273	Women Writing Culture
ANTH 282	Performance and Culture
CAPS 407	Women in the World Economy
ENGL 227	Contemporary Caribbean Literature: Voyage of Discovery
GEOG 223	Gender and Geography
SPAN 295	Escritoras Hispanoamericanas
SPAN 324	Cuentistas Latinoamericanas
SPAN 324	El Género en la Literatura Hispanoamericana del siglo
WMST 232	Gender and Sexuality in South Asia
WMST 251	Women and Development
WMST 273	Women Writing Culture

- Four courses from the women's and gender studies approved course list selected in consultation with your women's and gender studies adviser.
- One seminar. Any 300- or 400- level course from the approved list. (Contact the women's and gender studies director or academic assistant for a full list of approved courses.)

No more than two 100-level courses can count toward the major.

Women's and gender studies majors may participate in the honors program, subject to the general guidelines of the university Honors Council. Applications should be made to the women's and gender studies Advisory Board, after selecting an honors adviser from among the women's and gender studies faculty.

The **minor** in women's and gender studies requires five courses:

- WMST 140 Introduction to Women's and Gender Studies in the Humanities or WMST 150 Introduction to Women's and Gender Studies in the Social Sciences.
- One of the following courses: WMST 220 Introduction to Feminist Thought, ANTH 232 Gender and Sexuality in South Asia, ANTH 270 Sexuality and Culture, ANTH 273 Women Writing Culture, ANTH 282 Performance and Culture, CAPS 407 Women in

the World Economy, ENGL 227 Contemporary Caribbean Literature: Voyages of Discovery, GEOG 223 Gender and Geography, SPAN 295 Escritoras Hispanoamericanas, SPAN 324 Cuentistas Latinoamericanas, SPAN 324 El Género en la Literatura Hispanoamericana del siglo, WMST 232 Gender and Sexuality in South Asia, WMST 251 Women and Development, WMST 273 Women Writing Culture.

- Three courses from the women's and gender studies approved list. No more than two of these may be in a single department.

Study off campus and/or abroad is strongly encouraged for both majors and minors in women's and gender studies. Internships and field experience also are possible for course credit but should be planned and approved at least six months in advance of the semester in which they are to be taken.

Students wishing to declare a women's and gender studies major or minor should contact the director of the women's and gender studies program.

Women's and Gender Studies Course List
The following courses are approved for the women's and gender studies major and minor.

ANTH 232	Gender and Sexuality in South Asia
ANTH 270	Sexuality and Culture
ANTH 273	Women Writing Culture
ANTH 282	Performance and Culture
ART 319	Special Studies: English Renaissance
CAPS 401	Renaissance Women
CAPS 407	Women in the World Economy
CAPS 413	Fairy Tales as Historical Documents
CAPS 419	Examining our Lives: Issues in Autobiography
CAPS 428	Mating and Marrying in America
CAPS 431	Women and the Penal System
CAPS 451	Voices of the Renaissance Literature
CAPS 496	Sex–Wanted and Otherwise
CAPS 497	Women in the Workplace
CLAS 237	Ethnicity, Gender, and Identity in Antiquity
CLAS 350	Women in the Ancient World
ECON 236	Unemployment and Poverty
ECON 319	Economic History of Women in the United States
EDUC 290	Gender Issues in Education
ENGL 140	Introduction to Women's and Gender Studies in the Humanities
ENGL 213	Southern Exposure
ENGL 214	Nineteenth-century American Women Writers
ENGL 215	Twentieth-century American Women Writers
ENGL 223	Survey of Women's Literature
ENGL 227	Contemporary Caribbean Literature
ENGL 228	Topics in Gender Studies
ENGL 235	Gender and Film
ENGL 286	The Modern Novel: V. Woolf
ENGL 307	Emerson, Dickinson, Whitman
ENGL 340	Arthurian Realms

ENGL 370	Seminar in 19th-century English Literature: Romantic Musings
ENGL 398	Gender Criticism
ENGL 401	Unsettling Memories: Body & Trauma in Southern Literature and Photography
ENGL 450	Renaissance Women's Writing
FREN 395	Women's Cinema
GEOG 223	Gender and Geography
HIST 238	Witchcraft and Magic in Early Modern Germany
HIST 246	Medieval Heretics and Heresies
HIST 258	Topics in Women's and Gender History
HIST 279	Topics in the History of Science and Medicine: Women in Science and Technology
HIST 279	Topics in the History of Science and Medicine: Women, Health, and Medicine
HIST 330	The Right to Bear Arms in Historical Context
HIST 351	Women's and Gender History: Women and Modern Europe
HUMN 320	History of Sexuality
HUMN 330	Studies in Autobiography
POLS 254	Sex and Social Order
PSYC 232	Psychology of Women
PSYC 306	Advanced Abnormal Psychology: Psychology of Trauma
PSYC 373	Psychology of Race and Gender
RELI 211	Women in Judaism: Matriarchs, Daughters, and Wives
RELI 234	Issues of Religion and Culture
SOCI 434	Race, Gender, Sexuality, and Identity
SPAN 295	Escritoras Hispanoamericanas
SPAN 324	Cuentistas Latinoamericanas
SPAN 324	El Género en la Literatura Hispanoamericana del siglo
WMST 140	Introduction to Women's and Gender Studies
WMST 150	Introduction to Women's and Gender Studies
WMST 220	Introduction to Feminist Thought
WMST 232	Gender and Sexuality in South Asia
WMST 251	Women and Development
WMST 270	Special Topics
WMST 273	Women Writing Culture
WMST 319	Independent Study – Women's and Gender Studies
WMST 320	Independent Study – Women's and Gender Studies
WMST 370	Special Topics
WMST 390	Honors in Women's and Gender Studies
WMST 475	Topics in Feminist Theory

Courses offered occasionally: ENGL 398 Seminar in Critical Theory: Freud and Feminism, GRMN 322 Leitmotifs in 19th-century German Culture, MUSC 267 Topics in Music History: The Life and Works of Fanny Mendelssohn Hensel (1805-1847), PHIL 230 Feminism and Philosophy

140. Introduction to Women's and Gender Studies (I or II; 3, 0)
Interdisciplinary introduction to the major theories, themes, methodologies, and issues of women's and gender studies. Emphasis in the humanities. Not open to students who have taken WMST 150.

150. Introduction to Women's and Gender Studies (I or II; 3, 0)
Interdisciplinary introduction to the major theories, themes, methodologies, and issues of women's and gender studies. Emphasis in the social sciences. Not open to students who have taken WMST 140.

220. Introduction to Feminist Thought (I or II; 3, 0)
Explore the broad range of work that lays the intellectual and theoretical groundwork for contemporary feminist theory and politics.

232. Gender and Sexuality in South Asia (I or II; 3, 0)
Explores issues of gender and sexuality in South Asia, primarily India and Sri Lanka. Topics include marriage, family, life cycle, religion, and nationalism. Crosslisted as ANTH 232.

251. Women and Development (I or II; 3, 0)
This course examines the relationship between women and development, as an ideological economic, political, and social enterprise. Crosslisted as ANTH 251.

270. Special Topics in Women's and Gender Studies (I or II; R; 3, 0)
A course on special topics of interest to faculty members, offered occasionally. Subject varies.

273. Women Writing Culture (I or II; 3, 0)
This course explores the genre of ethnography as it has been used to examine women's lives and issues of gender around the world. Crosslisted as ANTH 273.

319 and 320. Independent Studies (I and II; 3, 0)
Independent study supervised by a women's and gender studies faculty member. Prerequisite: permission of the instructor.

370. Special Topics in Women's and Gender Studies (I or II; R; 3, 0)
Advanced course on special topics of interest to faculty members, offered occasionally. Subject varies.

390. Honors in Women's and Gender Studies (I or II; 3, 0)
Individual, special projects supervised by instructor, culminating in honors thesis. Prerequisite: permission of the instructor.

475. Topics in Feminist Theory (I or II; 3, 0)
Advanced seminar designed to model the process of interdisciplinary feminist study and engage students in critical theoretical debate on central questions in women's studies. Prerequisite: permission of the instructor. Crosslisted as SOCI 475.

COLLEGE OF ENGINEERING CURRICULA

The College of Engineering is dedicated to providing outstanding educational opportunities in engineering to a predominantly undergraduate student body of talented men and women. In accord with the University's Mission Statement, the College nurtures the intellectual, professional, and personal development of its students. The College strives to prepare them for entry into the engineering profession, related fields and graduate programs, and for continuing development as highly competent professionals and responsible members of society.

A Bucknell University engineering education is distinguished by frequent interaction between students and faculty, a strong laboratory component in the curricula, and an emphasis on learning within a liberal arts university environment. The faculty are dedicated to teaching excellence and are actively engaged in scholarship in support of the educational mission, the discipline, or the profession.

Curricula in the College of Engineering lead to the degrees of bachelor of science in the disciplines of biomedical, chemical, civil, computer, electrical, and mechanical engineering, as well as the bachelor of science in computer science and engineering. Integrated five-year liberal arts/engineering programs, leading to bachelor of science and bachelor of arts degrees or a bachelor of science and bachelor of management for engineering degree, are also offered. In addition, students may choose to integrate their studies by concentrating their electives to pursue interests in a particular area such as biomedical or environmental engineering. The cross-disciplinary nature of these studies allows students from several disciplines to participate in available courses.

Each of the engineering programs emphasizes the fundamentals of mathematics, natural sciences, and engineering science, combined with specialized study in a particular discipline and broadening studies in the humanities and social sciences. Students interested in pursuing computer science as a major may do so as an option under the bachelor of science in computer science and engineering curriculum (page 255) or under the bachelor of science degree program (page 58) or the bachelor of arts degree program (page 58).

Programs in Engineering

The programs leading to the degrees of bachelor of science in computer science and engineering, chemical, civil, electrical, and mechanical engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board of Engineering and Technology. All of the programs, including biomedical engineering and computer engineering, are designed to develop in students a broad understanding of engineering disciplines, an appreciation of the engineer's individual and professional role in society, and a capacity for lifelong learning.

The undergraduate engineering programs cover four years, but in five years a student may complete a joint degree in liberal arts and engineering with a major in each college. First-year engineering students may select a specific engineering major when they enroll or remain undecided during the first semester. Engineering students may change from one engineering program to another (with the exception of biomedical engineering) at the end of one or two semesters; later changes are more difficult but may be possible. Changes into the biomedical engineering program are limited due to enrollment restrictions in the program. Students in the College of Arts and Sciences who apply to transfer to the College

of Engineering will be subject to a review of their academic performance at Bucknell for entrance into any engineering program, subject to enrollment limitations that may be in place in specific degree programs. Specific information may be obtained from the associate dean, College of Engineering. During the fall term, all first-year engineering students take calculus, physics, an elective and an introductory engineering course, ENGR 100 (unless they have earned AP or other credit or have a special educational need). In the spring term, they take the first course in their engineering major. The sophomore year continues the emphasis on science and mathematics, and introduces courses in the engineering sciences, such as mechanics, thermodynamics, fluids, and materials. During the junior and senior years, most of the work is concerned with the principles of the student's major engineering discipline.

Each program contains courses in mathematics and natural sciences, a general education component, courses in engineering sciences and in design, systems, and synthesis. The remaining courses, depending upon the specific program, may be in the student's engineering discipline or in electives.

The General Education Component lends perspective to the traditional engineering studies to promote an understanding of the impact of engineering solutions in a global and societal context. The general education component also is intended to broaden the intellectual and experiential horizons of the student, to develop creative and critical abilities, and to facilitate an understanding of the social problems faced by humankind in the past, present, and future.

To fulfill the general education requirement, engineering students must successfully complete approved courses in humanities and social sciences. Ordinarily, courses that instill cultural values are approved, while courses that develop personal or professional skills are not. Therefore, approved courses that involve performance also must include theory or history of the subject. Students will fulfill the general education component through a minimum of five approved humanities and social sciences courses, with the following distribution:

- A minimum of two courses in humanities; one must be a first-year course in English literature and composition, and
- A minimum of two courses in social sciences.

At a minimum, one of the humanities or social sciences courses must satisfy the global and societal perspectives requirement. Of the five courses, two must be from a single department, or at least one course must be at the 200 level or above. Individual departments may have additional requirements.

The current list of approved social science and humanities and global and societal perspectives courses can be obtained in the Office of the Dean of Engineering. The list is updated annually by the Engineering Curriculum Committee.

In addition, the engineering curricula reflect the increased importance of design in the education of today's students by an integration of design instruction from ENGR 100 through all four years to the senior design courses. The emphasis of all programs is on the development of a broad foundation in engineering and on the initiation of specialized study in a specific engineering discipline.

Whenever appropriate, students may engage in special projects in creative design or in independent study, or they may participate with a faculty member in a research project. Such projects may start in or be carried forward into the summer.

Several engineering departments offer a program of department honors in which selected majors may undertake special studies or investigations, leading to graduation with honors.

Students are encouraged to work with their faculty advisers and department chairs to take full advantage of the flexibility of the engineering programs, which makes possible special plans of study appropriate to their individual career objectives. Furthermore, with the approval of the department chair and the dean of the College of Engineering, degree requirements may be altered slightly to accommodate special needs of students with different academic backgrounds, and those who have transferred from other degree programs or from other institutions.

All engineering degree programs require the completion of 34 courses (42 in the combined liberal arts-engineering program and the engineering-management program) with a cumulative grade point average (GPA) of at least 2.00 overall and in engineering.

To satisfy the **University writing requirement**, a student must successfully complete three writing courses: one course designated W1 (which must be taken during the first year and which must be taken before the W2 courses) and two W2 courses (usually taken after the first year, but, in any case, at least one of which must be taken after the first year.) Lists of W1 and W2 courses are available on the Registrar's home page (www.bucknell.edu/Registrar/) under Course Information. See page 285 for a full description of the writing program.

Writing courses are designed to enhance the student's understanding of the writing process and to emphasize that writing is a way of learning as well as a communication skill. They may be taken in any department.

Students in the College of Engineering, through judicious choice of electives, may choose a departmental or interdepartmental minor (see page 21).

Those students who wish to apply the principles, concepts, and methods from their prospective majors to define, understand and solve problems in the life sciences and medical technology have several options. First, students may major in one of the five ABET-accredited bachelor of science programs in engineering and use their elective courses to concentrate on biology, chemistry, and biomedical engineering. (Biology students may elect to use their unrestricted electives to take engineering courses.) Second, through a judicious choice of electives, engineering students may complete the **chemical and biological studies minor** or the **biomedical engineering minor** (see page 249)**.** The chemical and biological studies minor allows students to enhance their study of the basic chemical and biological sciences. Alternatively, students may elect the biomedical engineering minor which combines study of the basic biological sciences with their technological application. Students majoring in chemical engineering or biomedical engineering are not eligible for the chemical and biological studies minor. Faculty advisers in these disciplines will advise students on the appropriateness of the various options in light of their particular career goals. Information about specific faculty advisers may be obtained from the Office of the

Dean of Engineering. Students wishing to complete the premedical requirement should consult the pre-health professions adviser.

To complete the **chemical and biological studies minor**, students must successfully complete at least five courses as indicated below:

- CHEM 211 Organic Chemistry I
- CHEM 212 Organic Chemistry II
- CHEM 351 Biochemistry or CHEM 231 Analytic Chemistry or CHEM 202 General Chemistry II (CHEM 221 or CHEM 201 are prerequisites for these courses)
- BIOL 205 Introduction to Molecules and Cells
- BIOL 206 Organismal Biology

In order to declare a minor a student should obtain a Declaration of Minor card from the Office of the Registrar and have it signed by the department chair offering the minor or by the coordinator for the particular interdepartmental minor. The completed and signed card should be returned to the Office of the Registrar before the end of the first two weeks of the last semester of the senior year (by September 9 for first semester graduates and February 9 for second semester graduates). Students planning on summer graduation must have the card filed by the preceding March 1. Late declarations will not be recorded on the student's permanent record.

Program in Liberal Arts and Engineering

The five-year programs in liberal arts and engineering offer students the opportunity to obtain a broader education in the arts or sciences while completing the requirements for a major in engineering. For example, students may combine electrical engineering and Japanese. Upon successful completion of this program, the single degree, bachelor of science in electrical engineering and bachelor of arts, is awarded.

The major in the bachelor of arts program may be in one of the following subjects: animal behavior, anthropology, art, art history, biology, chemistry, classics, computer science, East Asian studies, economics, education, English, French, geography, geology, German, history, international relations, Japanese, Latin American studies, mathematics, music, philosophy, physics, political science, psychology, religion, Russian, sociology, Spanish, theatre and dance, or women's and gender studies. (For students desiring to design their own bachelor of arts program, either the interdepartmental major or the college major provides the opportunity.)

Students may enter these joint programs at any time during the first five semesters of one of the engineering B.S. programs. Students also may apply to enter this program from one of the programs in the College of Arts and Sciences. The timing for this change is critical because of the sequential nature of the courses in the engineering programs. Students interested in making this academic change should consult the associate dean of the College of Engineering as early as possible and not later than the third semester of study.

Students in this program must fulfill the distribution requirements and the major requirements for the degrees of bachelor of arts and either the bachelor of science in biomedical, chemical, civil, computer, electrical, or mechanical engineering, or bachelor of science in computer science and engineering. Suggested course sequences for each five-year program are available from the Office of the Dean of Engineering.

Program in Engineering and Management

The five-year program in engineering and management offers students the opportunity to combine the study of engineering in any of the engineering degree programs with a selected sequence of courses in management. Upon successful completion of this program, the joint degree, the bachelor of science in engineering degree (*within a specific engineering discipline*), and the bachelor of management for engineers degree, is awarded. The degree has the same accreditation status as the four-year bachelor of science degree in the engineering program selected. Specific course requirements for the bachelor of management for engineers degree may be found on page 152.

Prospective students interested in pursuing this five-year degree program are encouraged to apply for admission directly into the program. Students also may enter this joint degree program during the first four semesters of one of the engineering B.S. programs, and should consult with the associate dean of engineering as early as possible and not later than the third semester of study. *Admission to this joint degree program may be limited by enrollment.*

Suggested course sequences for the program and detailed information on the degree requirements are available from the Office of the Dean of Engineering and the department of management.

Graduate Studies

Bucknell University's graduate program leads to the degrees of master of science in chemical, civil, electrical, environmental, or mechanical engineering. Each graduate program is individually tailored to meet the needs, preparation, and goals of the student.

Undergraduate students who have completed three years in the chemical, civil, electrical, or mechanical engineering program at Bucknell, earned a cumulative grade point average of at least 2.80, and who show aptitude for graduate study, may apply for admission to the integrated 3-2 program. This program permits selected students to complete all requirements for both a bachelor of science degree and a master of science degree in five years. Those students who are selected receive a full tuition scholarship for the fifth year.

Traditional master's degree programs are offered in addition to the special 3-2 program. Assistantships are available. Information can be obtained from the dean of engineering or the director of graduate studies.

In addition to formal master's degree programs, the regular undergraduate student who has arranged to complete all undergraduate degree requirements may, with prior approval, take up to two courses for graduate credit. An application for graduate credit by undergraduate students may be obtained from the Office of Graduate Studies or the Office of the Registrar.

Bachelor of Science in Biomedical Engineering

Mission Statement

The biomedical engineering department is dedicated to providing the best possible undergraduate biomedical curricula to meet the full range of needs of a highly selective, undergraduate, student body. The program is designed to ensure that our students are qualified to enter and succeed in the biomedical engineering profession through direct entry to the industrial workplace or further professional study. The department strives to

achieve a process of continuous improvement of the curricula, provide a faculty which is professionally current in their field and to maintain state-of-the-art facilities.

To do this, the department offers the following:

- A bachelor of science in biomedical engineering degree for students seeking a comprehensive education in biomedical engineering.
- A minor in biomedical engineering for students in other engineering disciplines seeking a basic competency in the discipline and enhanced background in the life sciences.
- Elective courses to support the needs of students outside of the major and minor programs.

Program Educational Objectives
Recipients of the bachelor of science in biomedical engineering degree will meet the following program educational objectives:

Technical Competency – Graduates of the biomedical engineering program at Bucknell University will demonstrate a knowledge of discipline-specific material, mathematics, engineering sciences, computer science, and physical and biological sciences, as well as the interrelationships among the foregoing subjects, acquired through study, experimentation and problem solving involving analysis, computation and critical thinking.

Intellectual Development – Graduates of the biomedical engineering program at Bucknell University can apply fundamental principles and techniques from engineering, the physical and biological sciences, and mathematics to synthesize and evaluate alternative solutions to complex engineering problems with specified constraints.

Social Responsibility – Graduates of the biomedical engineering program at Bucknell University will exhibit professional responsibility and a sensitivity to a broad range of societal concerns including ethical, environmental, political, and regulatory issues in making decisions. Their decisions will be guided by an understanding of and appreciation for global/societal issues.

Professional Development – Graduates of the biomedical engineering program at Bucknell University will understand the necessity for growth and self-reflection to engage in successful practice and a development throughout their careers. Development of personal and interpersonal skills is essential to careers as leaders. Constructive participation in commonly encountered, multidisciplinary, team-centered environments will require flexibility, self-confidence, effective communication, leadership, continuous planned learning, selfless contributions towards team objectives, and ethical conduct.

The **bachelor of science** in biomedical engineering requirements are:

First Year	**First Semester:** ENGR 100; MATH 201; PHYS 211; First-year course in English literature and composition	4.00
	Second Semester: CHEM 221; MATH 202; PHYS 212; Elective	4.00
Sophomore Year	**First Semester:** BMEG 210; CHEM 211; MATH 211; MATH 226* Elective	4.50
	Second Semester: BIOL 206; CHEM 212; CHEM 231; MATH 212	4.00

Junior Year	**First Semester:** BIOL 205; BMEG 205, BMEG 220*, CHEM 341; Elective	4.50
	Second Semester: BMEG 300; BMEG 350; BMEG 408*; ENGR 240; Elective	4.50
Senior Year	**First Semester:** BMEG 400; BMEG 401; BMEG 409*; Two electives	4.50
	Second Semester: BMEG 402; Three electives	4.00

The 10 elective courses are distributed as follows:

- Five social science and humanities courses selected from the list of approved courses provided in *The Information for Engineering Students Handbook* (published by the College of Engineering) to fulfill the General Education Component required of all engineering students. These courses must be distributed as follows: 1) minimum of two courses in humanities; one must be a first-year course in English literature and composition or creative writing, or a Foundation Seminar in English literature; 2) minimum of two courses in social sciences. Two of these five electives must be taken in one department OR at least one elective must be taken at the 200+ level in any department. One of the five courses must satisfy the global and societal perspectives requirement.
- One approved 200+ level engineering course from the list published by the department.
- One approved 300+ level engineering course from the list published by the department.
- One BMEG engineering elective course from the list published by the department.
- One approved 200+ level physiology course from the list published by the department.
- One course in any department or program of the university provided that the prerequisites are satisfied.

*Half course.

Three courses in each student's program must fulfill the University writing requirement. (See page 245.)

Minor in Biomedical Engineering

Engineering students not pursuing the bachelor of science in biomedical engineering may choose to pursue a **minor** in biomedical engineering. This minor is attained through a judicious use of electives that combine the study of the basic biological sciences with their area of technological interest. To complete the biomedical engineering minor, engineering students must successfully complete at least four courses from select courses as prescribed by the biomedical engineering department. The minor in biomedical engineering requirements are:

- One 400+ level biomedical engineering course. Current courses include: BMEG 421 Light-activated Therapy, BMEG 431 Biomimetic Materials, BMEG 441/ELEC 411 Neural Signals and Systems, BMEG 451 Biomechanics and Injury Prevention, BMEG 471 and 472 Advanced Topics in Biomedical Engineering.
- Three courses from the following:

  Engineering
  CHEG 452 Bioprocess Engineering

CHEG 470	Biomaterials
Biology or Chemistry	
BIOL 205	Introduction to Molecules and Cells
BIOL 206	Organismal Biology
BIOL 207	Genetics
BIOL 221	Human Physiology
BIOL 312	Comparative Vertebrate Anatomy
BIOL 318	Comparative Physiology
BIOL 322	Physiological Mechanisms
BIOL 323	Microanatomy
BIOL 324	Neurophysiology
BIOL 326	Cytogenetics
BIOL 327	Molecular Biology
BIOL 328	Endocrinology
BIOL 340	Biochemical Methods (CHEM 358)
BIOL 343	Neural Plasticity
BIOL 348	Immunobiology
BIOL 352	Cell Biology
BIOL 365	Introduction to Microscopy
CHEM 340	Biological Physical Chemistry
CHEM 351	Biochemistry I
CHEM 352	Biochemistry II
CHEM 358	Biochemical Methods (BIOL 340)

Bachelor of Science in Chemical Engineering

Mission Statement

The chemical engineering department is dedicated to providing educational opportunities in chemical engineering to a highly selective, predominantly undergraduate student body of talented individuals. The department encourages close interactions between students and the faculty, who are dedicated to education and are actively engaged in scholarship that enriches the educational program. The program emphasizes active learning with a strong laboratory component. The department nurtures the intellectual, professional and personal development of its students and faculty in order to prepare and encourage them to be highly competent professionals and responsible members of society.

Program Educational Objectives

The department's curriculum is designed to develop graduates that:

- Demonstrate a knowledge of discipline specific material, mathematics, engineering sciences, computer science, and natural science, as well as the interrelations among the forgoing subjects, acquired through study, experimentation and problem solving involving analysis, computation and critical thinking.
- Can apply fundamental principles and techniques from engineering, the natural sciences, and mathematics to synthesize and evaluate alternative solutions to complex engineering problems with specified constraints.
- Exhibit professional responsibility and a sensitivity to broad range of societal concerns including ethical, environmental, political, regulatory, and global issues in making decisions.

- Exhibit skills which promote successful professional practice and future growth. Careers as leaders will require constructive teamwork and leadership, self-confidence, effective communication, and continual learning.

The requirements are:

First Year	**First Semester:** ENGR 100; First-year course in English literature and composition as prescribed below; MATH 201; PHYS 211	4.00
	Second Semester: CHEM 221; CHEG 200; ENGR 215*, MATH 202; Elective; CHEG 101**	4.50
Sophomore Year	**First Semester:** CHEM 211; ENGR 240; MATH 211; ENGR 211*; Elective	4.50
	Second Semester: CHEM 212; CHEM 231, ENGR 233; CHEG 102**; CHEG 210	4.00
Junior Year	**First Semester:** CHEM 343; CHEG 300; CHEG 302*; Two Electives	4.50
	Second Semester: CHEG 310; CHEG 315*; Three electives; CHEG 103**	4.50
Senior Year	**First Semester:** CHEG 320; CHEG 400; Two electives	4.00
	Second Semester: CHEG 330, CHEG 410; Two electives; CHEG 104**	4.00

The following sequence of courses emphasizes design across the curriculum and develops the professional skills of communication, problem-solving, teamwork, and self-directed learning: CHEG 200, ENGR 233, CHEG 300, CHEG 315, CHEG 400, and CHEG 410.

The 12 elective courses shown above are distributed as follows:

- Five social science and humanities courses selected from the list of approved courses provided in *Information for Engineering Students Handbook* (published by the College of Engineering) to fulfill the General Education Component required of all engineering students. These courses must be distributed as follows: 1) a minimum of two courses in humanities; one must be a first-year course in English literature and composition or creative writing, or a Foundation Seminar in English; 2) a minimum of two courses in social sciences. Two of these five electives must be taken in one department OR at least one elective must be taken at the 200+ level in any department. One of the five courses must satisfy the global and societal perspectives requirement.
- Two courses selected from the list of approved technical electives published by the department which may be found on the department web page.
- One approved biological-science course selected from the list of approved biological-science electives published by the department which may be found on the department web page.
- Two additional courses in chemical engineering.
- Two unrestricted electives in any department or program of the University.

*Half course.

**No credit.

Three courses in each student's program must fulfill the University writing requirement. (See page 245.)

Through judicious choice and curricular planning, students may be able to select a concentration – a series of electives that will allow development of expertise in a particular sub-discipline of chemical engineering. The following concentrations are available: Biological, Environmental, Materials, and Process. Declaration of a concentration is optional. Up-to-date listings of courses which can be used toward a concentration, and other associated requirements, are maintained on the department web page.

Bachelor of Science in Civil Engineering

Mission Statement

Bucknell University's civil engineering program strives to provide the best undergraduate civil engineering education possible within a four-year curriculum. The civil engineering degree program seeks to prepare our students to become responsible, contributing members of society, and to continue to develop personally and professionally after graduation. The program is designed to ensure that our students are qualified to enter, and succeed in, the civil engineering profession, enroll in graduate programs in civil engineering, or enter related industrial and business professions. Primary emphasis is placed on educational excellence achieved through a coherent and comprehensive curriculum, outstanding teaching, extensive student-faculty interaction, small class sizes, substantial laboratory and field trip experiences, and faculty scholarship that often directly involves students.

Program Educational Objectives

The civil engineering program seeks to prepare students to be successful professionals recognized for their: 1) critical thinking and problem solving based on a fundamental knowledge of humanities, social sciences, mathematics, science, engineering sciences, and a broad range of civil engineering technical areas; 2) consideration of global and societal concerns, ethics, and sustainability when making engineering decisions; 3) leadership and effective communication; 4) civil engagement and contributions to society; and 5) pursuit of lifelong learning and professional development.

The requirements are:

First Year	**First Semester:** ENGR 100; MATH 201; PHYS 211; Elective: first-year course in English literature and composition	4.00
	Second Semester: ENGR 101*; ENGR 220; MATH 202; GEOL 150; Elective	4.50
Sophomore Year	**First Semester:** ENGR 208; CHEM 201; MATH 211; MATH 226*; Elective	4.50
	Second Semester: ENGR 222; ENGR 242; MATH 222*; Science elective: CHEM/PHYS (200-level or above), or BIOL; Elective	4.50
Junior Year	**First Semester:** CENG 300; CENG 340; CENG 350; ENGR 212*; Elective	4.50
	Second Semester: CENG elective; CENG 320, CENG 330; Technical elective	4.00

Senior Year	**First Semester:** CENG 490; CENG elective; Elective; Technical elective	4.00
	Second Semester: CENG 491; Two CENG electives; Elective	4.00

The 14 elective courses shown above are distributed as follows:

- One science elective: chemistry or physics (200 level or higher) or biology approved by the department.
- Students must fulfill the General Education Component through a minimum of five approved humanities and social science courses, with the following distribution:
  1. A minimum of two courses in humanities; one must be a first-year course in English literature and composition, and
  2. A minimum of two courses in social sciences.

  At a minimum, one of the humanities or social science courses must satisfy the global and societal perspectives requirement. Of the five courses, two must be from a single department, or a least one course must be at the 200-level or above.
- Two unrestricted electives.
- Four civil engineering electives.
- Two technical electives: one must be either ENGR 200 or ELEC 105. The other must be an approved course in either civil engineering, computer science, engineering, mathematics or science.

Three courses in each student's program must fulfill the University writing requirement. (See page 245.)

*Half course.

Bachelor of Science in Computer Engineering

Mission Statement

The bachelor of science degree in computer engineering is an interdisciplinary degree offered jointly by the departments of computer science and electrical engineering. Computer engineering is the integrated study of both computer hardware and software systems to solve problems and create new systems. The bachelor of science degree in computer engineering consists of required courses in computer science and electrical engineering providing in-depth exposure to both disciplines. Students can then select electives in computer science or electrical engineering to focus their course of study towards their individual interests.

Program Educational Objectives

Graduates of the computer engineering program will:

- Demonstrate a working knowledge of mathematics, natural sciences, engineering sciences, electrical engineering, and computer science, and have the ability to apply that knowledge to analyze, design, and implement solutions to engineering problems related to the computer engineering discipline.
- Have the ability to synthesize multiple design solutions to computer engineering problems with specified constraints through the creative integration of the fundamental principles and techniques of engineering, mathematics, and the sciences.

- Exhibit professional responsibility and a sensitivity to a broad range of societal concerns in making decisions, including an understanding of, and appreciation for, the needs of society in a global context.
- Recognize the necessity for personal growth, self-reflection, and assessment to engage in successful professional practice and development throughout their careers.
- Demonstrate constructive participation in team-based activities.
- Exhibit an ability to communicate well, both orally and in writing.
- Be prepared for direct entry into the profession and to continue their education in graduate work.

The **bachelor of science** in computer engineering requirements are:

First Year	**First Semester:** ENGR 100; MATH 201; PHYS 211; Elective	4.00
	Second Semester: CSCI 203; ELEC 120; MATH 202, PHYS 212	4.00
Sophomore Year	**First Semester:** CHEM 201; MATH 211; CSCI 204; ELEC 225*; Elective	4.50
	Second Semester: MATH 212; CSCI 206; ELEC 226*; ELEC 247; Elective	4.50
Junior Year	**First Semester:** CSCI 208; ELEC 320; ELEC 350; Elective	4.00
	Second Semester: ELEC 340; MATH 241; CSCI 315; ENGR 138*; Elective	4.50
Senior Year	**First Semester:** ELEC 471; ELEC 400*; CSCI 320; Two electives	4.50
	Second Semester: ELEC 421; Three electives	4.00

The 10 elective courses are distributed as follows:

- Five approved social science and humanities courses to meet the engineering General Education requirements. Those courses are distributed as follows:
  1. A minimum of two courses in the humanities; one must be a first-year course in English literature and composition.
  2. A minimum of two courses in the social sciences.
  3. One of the courses must satisfy the global and societal perspectives requirement.
- One course at the 200 level or above in the natural sciences (physics, chemistry, biology, or BIOL 121, 122, GEOL 103, 150)
- Two courses chosen from the 300-level computer science or 400-level electrical engineering course offerings
- Two unrestricted courses in any department or program in the university

Three courses in each student's program must fulfill the University writing requirement. (See page 245.)

*Half Course

Bachelor of Science in Computer Science and Engineering

Mission Statement

The mission of the computer science department at Bucknell University is to provide degree programs and courses, consistent with the missions of the university and the Colleges of Arts and Sciences and of Engineering, that meet the full range of needs of the talented, primarily undergraduate student body. To do this, the department provides the following:

- A bachelor of science in computer science and engineering degree program in the College of Engineering for students seeking a rigorous education in computer science and engineering with an emphasis on computer software.
- A bachelor of science degree program in the College of Arts and Sciences for students seeking a solid foundation in the sciences while gaining an in-depth preparation in computer science.
- A bachelor of arts degree program in the College of Arts and Sciences for students seeking a broad understanding of the liberal arts while gaining an in-depth preparation in computer science.
- A minor in computer science for students seeking basic competency in the discipline.
- Jointly with the electrical engineering department, an interdisciplinary bachelor of science in computer engineering degree program in the College of Engineering for students seeking a rigorous engineering education in computer systems and the interaction between computer hardware and software with an emphasis on computer hardware.
- Basic courses to support the general educational needs of students outside of the degree programs and minor.

The department's philosophy has the following four principles: Departmental programs will be based on a common core curriculum that supports the breadth of the discipline. Computer science courses should focus on principles; where appropriate, specific systems should be studied to illuminate the principles. Courses in the core curriculum should have a substantial hands-on component, usually in the form of a regularly scheduled laboratory. Departmental degree programs provide the background and experiences appropriate for entering the workplace at the technical level or graduate programs at the Ph.D. level.

Program Educational Objectives

Graduates of the computer science and engineering program will demonstrate:

1. Entry-level professional competency of discipline-specific principles and practices within the following areas of computer science: software system development, computer hardware organization and architecture, programming language theory and application, operating system design, and algorithm design and analysis.
2. Ability to apply discrete and continuous mathematics, natural sciences, and engineering sciences to the disciplines of computer science, general engineering, and basic electrical engineering.
3. Ability to combine principles and techniques from computer science, engineering sciences, and the social sciences and humanities to develop and evaluate design solutions to computer science problems with specified constraints.
4. Ability to contribute successfully to a team, communicate effectively, and be sensitive to a broad range of societal concerns impacted by the discipline.
5. Awareness of necessity for personal and professional growth.

The **bachelor of science** in computer science and engineering curriculum requires 12 course credits in computer science as specified below:

First Year	**First Semester:** ENGR 100; First-year course in English literature and composition; MATH 201; PHYS 211	4.00
	Second Semester: CSCI 203; MATH 202; PHYS 212; Elective	4.00
Sophomore Year	**First Semester:** CHEM 201†; CSCI 204; MATH 211; Elective	4.00
	Second Semester: CSCI 206; ENGR 220; MATH 222*; MATH 241, Elective	4.50
Junior Year	**First Semester:** CSCI 208; CSCI 311; ELEC 101; MATH 226*; Elective	4.50
	Second Semester: CSCI 240*; CSCI 315; ELEC 245; ENGR 139; One computer science elective;	4.50
Senior Year	**First Semester:** CSCI 320; CSCI 475* (Senior Design Project); MATH 343; One computer science elective; Elective	4.50
	Second Semester: CSCI 476; Computer science elective; Two electives	4.00

The seven elective courses shown are distributed as follows:

- One laboratory course in the natural sciences
- Five approved social science and humanities courses (in addition to the first-year course in English literature and composition) distributed as follows:
  1. A minimum of two courses in the humanities; (one could be the required first-year course in English literature and composition) and
  2. A minimum of two courses in the social sciences; one must be ECON 103.

  Two of these six courses (including the English literature and composition course) must be from the same department OR at least one course must be at the 200 level or above. A minimum of one of these five courses must satisfy the global and societal perspectives requirement. Lists of approved social science courses, humanities courses, and courses that contain global and societal perspectives are published by the College of Engineering.
- One course in any department or program of the University, provided the prerequisites are satisfied.

*Half course.
†See department policy for use of AP credit in chemistry.

Three courses in each student's program must fulfill the University writing requirement. (See page 245.)

As an alternative to the bachelor of science in computer science and engineering curriculum, students may wish to consider the major in computer science offered in the bachelor of science curriculum (see page 58) or in the bachelor of arts curriculum (see page 58).

Bachelor of Science in Electrical Engineering

Mission Statement

The electrical engineering department is dedicated to providing educational opportunities in electrical engineering and computer engineering to a highly selective, predominantly undergraduate, student body of talented men and women. The department is small and emphasizes close interactions between students and the faculty, who are dedicated to education and actively engaged in scholarship that enriches the educational programs. The program emphasizes active learning with a strong laboratory component. The department nurtures the intellectual, professional, and personal development of its students in order to prepare and encourage them to be highly competent professionals and responsible members of society.

Program Educational Objectives

The electrical engineering department strives to graduate students who can:

- Exhibit an ability to apply knowledge of basic natural sciences, engineering sciences, and mathematics to engineering problems that require synthesis, including the ability to analyze, design, and implement solutions to engineering problems.
- Exhibit an ability to communicate well, both orally and in writing.
- Be responsible, well rounded, and aware of broad social issues, and cognizant of the need for personal growth and self-reflection.
- Have significant hands-on laboratory and design experience.
- Be prepared for direct entry into the profession and to continue their education in graduate work.

The requirements are:

First Year	**First Semester:** ENGR 100; MATH 201; PHYS 211; Elective	4.00
	Second Semester: ELEC 120; MATH 202; PHYS 212; Elective	4.00
Sophomore Year	**First Semester:** CHEM 201; ELEC 225*; CSCI 203; MATH 211; Elective	4.50
	Second Semester: ELEC 226*; ELEC 247; ENGR 220; MATH 212; Elective (Science)	4.50
Junior Year	**First Semester:** ELEC 320; ELEC 350; ENGR 240; Elective	4.00
	Second Semester: ELEC 340; ELEC 351; ELEC 390; ENGR 138*; Elective	4.50
Senior Year	**First Semester:** ELEC 480; ELEC 491; ELEC 400*; ELEC 471; One elective	4.50
	Second Semester: ELEC 420; Three electives	4.00

The 10 elective courses shown above are distributed as follows:

- Five approved social science and humanities courses to meet the engineering General Education Component requirement. Those courses will be distributed as follows:
    1. A minimum of two courses in humanities; one must be a first-year course in English literature and composition.

2. A minimum of two courses in the social sciences.
3. One of the courses must satisfy the global and societal perspectives requirement.

- One course at the 200 level or above in the natural sciences (physics, chemistry, biology or BIOL 121, 122, GEOL 103, 150).
- At least one 400-level course in electrical engineering.
- Three unrestricted elective courses in any department or program of the University. It is recommended that students intending to attend graduate school also should choose at least one of these courses: MATH 343, MATH 345, or MATH 362.

*Half course; all others are one-credit courses.

Three courses in each student's program must fulfill the University writing requirement. (See page 245.)

Electrical engineering students who wish to pursue graduate studies in bioengineering or who wish to acquire the biology and chemistry needed in preparation for work or further study in the life sciences, are encouraged to take a minor in chemical and biological studies (see page 245). These students will be excused from the ENGR 240 requirement.

Bachelor of Science in Mechanical Engineering

The discipline of mechanical engineering is the branch of engineering that deals predominantly with the conversion, transmission and storage of mechanical and thermal energy; the generation, transmission and control of forces; the production and regulation of mechanical motion; and the optimal use of materials in the design and fabrication of the requisite machines and mechanisms.

Mission Statement

The mechanical engineering department is committed to providing the best undergraduate mechanical engineering education possible within the constraints of a four-year curriculum. In accord with the College of Engineering Mission Statement, the mechanical engineering department strives to nurture the intellectual, professional, and personal development of its students. The mechanism for achieving the department's educational mission is the program of study, the curriculum in mechanical engineering designed to satisfy its Program Educational Objectives. The department strives to achieve a process of continuous improvement of the curricula, to provide a faculty who are professionally current in their field and to maintain state-of-the-art facilities.

Program Educational Objectives

Content Knowledge Graduates of the mechanical engineering program at Bucknell University will demonstrate a working knowledge of discipline-specific material, mathematics, engineering sciences, computer science, and natural sciences, as well as the interrelationships among the foregoing subjects, acquired through study, experimentation and problem solving involving analysis, computation, and design.

Design Ability Graduates of the mechanical engineering program at Bucknell University will have the ability to synthesize multiple design solutions to complex engineering problems with specified constraints through the creative integration of fundamental engineering principles and techniques, natural sciences and mathematics.

Professionalism Graduates of the mechanical engineering program at Bucknell University will exhibit professional responsibility and sensitivity to a broad range of societal concerns including ethical, environmental, political, and regulatory issues in making decisions. Their decisions will be guided by an understanding of and appreciation for cultural diversity, global interactions, and the needs of the local, regional, state, national and world communities.

Self Assessment, Lifelong Learning and Teamwork Graduates of the mechanical engineering program at Bucknell University will understand the necessity for personal growth, self-reflection and assessment to engage in successful professional practice and development throughout their careers. Constructive participation in commonly encountered, multidisciplinary, team-centered environments will require flexibility, effective communication skills, leadership, continuous learning, selfless contributions toward team objectives, and ethical conduct.

In support of its mission the department offers a master's degree program in mechanical engineering, which has similar goals, while also striving to offer more breadth of knowledge, more detailed understanding, and enhanced technical competence in specialized sub-disciplines. The department supports its mission in a wider context by providing students in other technical disciplines with an understanding of the aspects of mechanical engineering that are appropriate for their own areas of specialization, and to supply a technology component for students enrolled in a liberal arts curriculum.

The requirements are:

First Year	**First Semester:** ENGR 100; First-year course in English literature and composition; MATH 201; PHYS 211	4.00
	Second Semester: ENGR 220; MATH 202; ENGR 214; Elective	4.00
Sophomore Year	**First Semester:** ENGR 240; MATH 211; MATH 226* MECH 213; Elective	4.50
	Second Semester: MATH 212; MECH 202*; MECH 252; MECH 216; Elective	4.50
Junior Year	**First Semester:** ELEC 105; MECH 313; MECH 353, MECH 355	4.00
	Second Semester: MECH 302; MECH 312; MECH 392; Elective	4.00
Senior Year	**First Semester:** MECH 401*; MECH 403; MECH 405; Two electives	4.50
	Second Semester: MECH 402*; Four electives	4.50

The 11 elective courses shown above are distributed as follows:

- One course in chemistry (CHEM 201 or CHEM 211 or CHEM 221) which must be taken in the first two years.
- Select any TWO full-credit courses, one of which must be in chemistry or physics at the 200+ level, the other of which must be from the following list or any full-credit 300-level courses in astronomy, biology, chemistry, geology or physics (except 336) for which prerequisites have been satisfied: ASTR 201, BIOL 121, BIOL 122, BIOL 205, BIOL 208,

BIOL 221, CHEM 160, CHEM 202, CHEM 211, CHEM 212, CHEM 231, GEOL 103, GEOL 150, GEOL 201, GEOL 205, GEOL 210, GEOL 214, GEOL 217, PHYS 212, PHYS 221, PHYS 222, PHYS 235.

- Five approved social science and humanities courses with the following distribution:
    1. A minimum of two courses in the humanities; one must be a first-year course in English literature and composition and
    2. A minimum of two courses in the social sciences.

  Two of these five courses must be from the same department OR at least one course must be at the 200 level or above. A minimum of one of these five courses must satisfy the global and societal perspectives requirement. Lists of approved social science courses, humanities courses, and courses that contain global and societal perspectives are published by the College of Engineering.
- One 400-level or equivalent course in any department of the College of Engineering.
- One 400-level course in the department of mechanical engineering or, with permission of the department, a course required for the expected fulfillment of a minor.
- One course in any department or program of the University.

*Half-credit course; all others are one-credit courses.

Three courses in each student's program must fulfill the University writing requirement. (See page 245.)

DEPARTMENTS, PROGRAMS AND COURSES[1]

Engineering Sciences (ENGR)

(Professors selected from the College of Engineering)
Lecturer: Amy Livermore

100. Exploring Engineering (I; 3, 2)
Introduction to the study and practice of engineering, including overviews of specific disciplines. Participatory focus involves group design projects, hands-on learning, computer work, team building, and engineering ethics discussion. Permission of instructor required for non-first-year students.

101. Engineering Graphics (II; 1, 2) Half course.
Introduction to engineering graphics including drawing with drafting instruments, computer-aided drafting, and surveying.

138. Written and Oral Communication (I or II; 2, 0) Half course.
Written and oral forms of communication, including preparation and presentation of job/internship search communication, memos, letters, and reports, with consideration of audience, purpose, structure, style, and language. Prerequisite: 100-level English course. Required for all bachelor of science in electrical engineering students. Open to other engineering students. Open to arts and sciences students as space permits.

[1]for abbreviations and codes, see page 416.

139. Technical Written and Oral Communication (I and II; 3, 0)
Written and oral forms of technical communication. Written forms include job/internship search communication, memos, letters, reports, manuals, proposals, brochures, and web pages. Oral techniques and presentations included. Emphasis on audience, purpose, structure, style, language, and persuasive strategies. Required for all bachelor of science in computer science engineering students and bachelor of science in computer science students. Open to other engineering and arts and sciences students as space permits. Permission of instructor required for first-year students.

200. Thermodynamics (I or II; 4, 0)
Properties, first law, second law, entropy, availability, efficiency, pure substances, real gases. Introduction to heat transfer. Prerequisite: MATH 201.

201. Electrical Instrumentation and Measurements (II; 1, 3) Half course.
Electrical instruments and techniques of measurement; laboratory analysis of elementary circuits. Not for majors in electrical engineering. Prerequisite: ELEC 105.

208. Mechanics of Materials (I; 4, 0)
Axial loading torsion, plane stress, and strain stresses in beams, deflection of beams, unsymmetrical bending, inelastic bending, column theory and design. Prerequisite: ENGR 220. Open to civil engineering students only.

211. Introduction to Chemical Engineering Computing (I; 2, 1) Half course.
Programming fundamentals and introductory numerical methods. Problems drawn from mathematics and chemical engineering. Prerequisites: CHEG 200 and MATH 202. Not open to students who have taken ENGR 212 or ENGR 214.

212. Engineering Computation (I; 1, 2) Half course.
An in-depth introduction to using computers as a fundamental tool for solving civil engineering problems. Course will include: structured programming and numerical methods. Prerequisite: MATH 222 or equivalent. Not open to students who have taken ENGR 211.

214. Computational Analysis (II; 3, 2)
Introduction to a modern computer language. Structured programming and algorithm design for engineering problems involving linear algebra, statistical analysis of data, and elementary numerical analysis. Introduction and use of a scientific applications package as a tool. Not open to students who have taken ENGR 211 or ENGR 212. Open to mechanical engineering students only.

215. Experimental Design and Data Analysis (II; 2, 1) Half course.
Introduction to the analysis of experimental and industrial data. Topics include statistical inference, analysis of variance, regression analysis, experimental design, and computational methods.

220. Mechanics I (I or II; 4)
Equilibrium of two- and three-dimensional force systems. Trusses and frames. Friction. Distributed force systems. Kinematic and kinetic analysis of particles. Prerequisite: MATH 201.

222. Fluid Mechanics (I or II; 3, 3)
Fluid properties and hydrostatics. Flow concepts and basic equations. Viscous flow in pipes and channels. Steady pipe flow. Potential flow. Introduction to open channels or hydraulic machinery. Prerequisite: ENGR 220.

231. Fluid Mechanics (I; 3, 0) Half course.
Nature of forces; incompressible and compressible fluids under conditions of streamline and turbulent flow. Prerequisite: MATH 202.

233. Fluid Mechanics (II; 4, 2)
Fluid statics, laminar and turbulent flow of incompressible fluids; introduction to compressible and non-Newtonian fluids; nature of forces, momentum transfer, shell balances; dimensional analysis; applications to pipe flow, drag, fluid measurement and pump design. Prerequisites: ENGR 100 and ENGR 215. Corequisite: CHEG 210.

240. Science of Materials (I or II; 3, 2)
Study of the relationships between atomic structure and observable properties of materials. Properties of metallic, ceramic, and polymeric materials. Selection of materials for engineering applications. Measurement and modification of material properties. Corequisite: CHEM 201/221 or equivalent or permission of the instructor.

242. Materials Engineering (II; 3, 3)
Elements of science of materials. Evaluation and control of properties of common engineering materials. Laboratory tests of materials. Visitation trips to see procedures and fabrication of selected materials. Prerequisite: ENGR 220.

248. Engineering Problems (I and II; R) Half to one course.
Problems in engineering adapted to the needs of the students. Prerequisite: permission of the instructor.

270. Technical Perspectives: Life, the Universe and Engineering (I or II; 4, 0)
Technical and critical evaluation of issues in our society using principles of mass and energy conservation and engineering design methodology. Issues may include: global warming, disposal of hazardous waste, product advertisements, pharmaceutical development and testing, product manufacturing successes and failures. Crosslisted as UNIV 270.

285. Leadership in Management and Technology (S; 1.5) Half course.
Interdisciplinary program for leadership in technology and management; macro and micro perspectives, design and TQM, ethical/professional considerations, environmental and energy management. Open only to students admitted to the Institute for Leadership in Technology and Management. Prerequisite: permission of the instructor. Crosslisted as MGMT 285.

290. Engineering: Global/Societal Context (S)
This study abroad course taught in the United Kingdom studies the global and societal context of engineering including impact of traditions, customs, and culture on engineering. A three-week study abroad course. Prerequisites: Must have completed the second year of an engineering program and permission of the instructor.

300. Professional Engineering (I and II; R; 1, 5-11) Half to one course.
The solution of small business engineering problems under the supervision of a faculty member. The projects will be selected by the Bucknell Small Business Development Center in cooperation with companies, faculty members, and students. Open only to engineering seniors. Prerequisite: permission of the instructor.

385. Internship in Management and Technology (S; 1.5, 0) Half course.
Internship in complex management challenges, the internal role of technology in organizations, and interdisciplinary decision-making. Open only to students admitted to the Institute for Leadership in Technology and Management. Prerequisites: ENGR/MGMT 285 and permission of the instructor. Crosslisted as MGMT 385.

410. Engineering Seminar (I or II) No credit.
Bi-weekly seminar to promote intellectual and professional exchange between students, faculty, and staff in the field of engineering. Prerequisite: senior status and permission of the instructor.

Courses offered occasionally: 301 Introduction to Nuclear Engineering, 302 Nuclear Reactor Engineering, 401 Transport Phenomena

Biomedical Engineering (BMEG)

Professors: James W. Baish, William E. King Jr.

Associate Professor: Daniel P. Cavanagh (Chair)

Assistant Professors: Donna M. Ebenstein, Eric A. Kennedy, Joseph V. Tranquillo

Affiliated Faculty:

Professor: Mitchell I. Chernin (biology)

Associate Professors: Arthur G. Shapiro (psychology), Margot A.S. Vigeant (chemical engineering)

205. Bioinstrumentation I (I; 3, 2)
Introduction to analog and digital circuits with applications to medicine and biology. Prerequisite: MATH 202. Open to biomedical engineering majors only.

210. Fundamentals of Biomedical Engineering (I; 3, 2)
Introduction to the application of fluid mechanics, mass transfer, instrumentation, mechanics, and societal issues to biomedical problems. Hands-on laboratory experiences integrated with lecture. Prerequisites: MATH 202, PHYS 212, CHEM 221. Open to biomedical engineering majors only.

220. Introduction to Engineering Computing (I; 2, 1) Half course.
Introduction to numerical methods and programming fundamentals. Problems drawn from mathematics, engineering, and biomedical engineering. Prerequisite: MATH 212. Not open to students who have taken ENGR 211, ENGR 212, ENGR 214.

300. Biotransport I (II; 3, 2)
First biotransport course focusing on the application of fluid mechanics principles to biological systems and medical devices. Properties of biological fluids, energy and

momentum balances, frictional losses, pumps, porous media flows, computational modeling. Prerequisite: MATH 212. Not open to students who have taken CHEG 300, ENGR 222, 233, 235.

350. Fundamentals of Biomedical Signals and Systems (II; 3, 2)
Time and frequency analysis, filter design and feedback control as applied to biomedical signals and systems. Corequisite: BMEG 205. Prerequisite: MATH 212. Open to biomedical engineering majors, others by permission of the instructor.

400. Biotransport II (I; 3, 2)
Second biotransport course focusing on the application of fundamental heat and mass transport concepts to biological systems and medical devices. Conduction, convection, thermal properties of materials, thermal regulation, mass diffusion, compartmental modeling. Prerequisite: BMEG 300 or permission of the instructor.

401. Biomedical Engineering Capstone I (I; 2, 2)
Senior design course emphasizing the biomedical engineering design process including problem identification and medical motivation, background research, medical regulations and ethics, design and project proposal presentation. Prerequisite: BMEG 300 or permission of the instructor.

402. Biomedical Engineering Capstone II (II; 2, 2)
Second semester of the biomedical engineering design sequence emphasizing fabrication, instrumentation, testing and evaluation, and final presentation of projects. Prerequisite: BMEG 401.

408. Medical Device Assessment and Development (II; 2, 0) Half course.
Emphasizes fundamental biomedical engineering research and design skills including medical device benchmarking, technical literature searching and reviewing, intellectual property, regulatory and professional issues, project planning and management, and individual and group work. Corequisite: BMEG 300 or permission of the instructor.

409. Fabrication and Experimental Design (I; 2, 0) Half course.
Second research methods course for focusing on experimental design, fabrication, formal technical documentation and report writing, and individual and team work. Prerequisite: BMEG 408. Corequisite: BMEG 401.

421. Light-activated Therapy (I or II; 4, 0)
Introduction of biophotonics or the use of light to treat both oncologic and non-oncologic diseases. Analysis of critical transport phenomena related to drug distribution, laser-tissue interactions, and oxygen supply. Investigation of mechanisms of photodynamic action. Prerequisite: permission of the instructor.

431. Biomimetic Materials (I or II; 4, 0)
Introduction to topics in biomimetics, studying nature as an inspiration for engineering design. Topics include relationships between microstructure and physical properties of natural materials and tissue engineering approaches to biomaterials design. Prerequisite: permission of the instructor.

441. Neural Signals and Systems (I or II; 4, 0)
Introduction to neural signals and systems. Topics include neural physiology, models of action potential generation and synapse dynamics, neural networks and techniques of neural waveform analysis. Prerequisite: permission of the instructor. Crosslisted as ELEC 411.

451. Biomechanics and Injury Prevention (I or II; 4, 0)
Introduction to the fields of musculoskeletal biomechanics and injury biomechanics. The overall goals of the class will be understanding the mechanical forces used for locomotion and determining the injury tolerance for events such as car crashes and sports injuries. Class will be a mixture of lectures and hands-on exercises. Prerequisite: permission of the instructor.

471 and 472. Advanced Topics in Biomedical Engineering (I and II; R; 4, 0)
Advanced in-depth courses developed from areas of biomedical engineering. Topics will vary. Prerequisite: permission of the instructor.

480 and 481. Biomedical Engineering Project (I and II; R; 1, 5) Half course
Individual work with a faculty adviser on development, design, or research project beginning with a written plan and culminating with a written or oral presentation. Prerequisite: permission of the instructor.

490 and 491. Biomedical Engineering Research (I and II; R; 1, 10)
Independent study with a faculty adviser on a research or design project. Submit a project proposal for group review, conduct the work, and culminate with a written and an oral presentation before a faculty group. Prerequisite: permission of the instructor.

Chemical Engineering (CHEG)

Professors: Jeffrey Csernica (Chair), Michael E. Hanyak Jr., William E. King Jr., Michael J. Prince, William J. Snyder

Associate Professors: Daniel P. Cavanagh, James E. Maneval, Margot A.S. Vigeant

Assistant Professors: Michael Gross, Erin L. Jablonski, Timothy M. Raymond, Brandon M. Vogel, Kat Wakabyashi

101, 102, 103, 104. Chemical Engineering Seminar (II; 1, 0) No credit.
A joint seminar for all chemical engineering students and faculty. Variety of engineering-related topics presented by industrial, academic, alumni, and student speakers. Presentations and discussions on professional development and interpersonal skills in the work place, ethics, and societal issues, professional society activities, and other topics relevant to the profession.

200. Chemical Engineering Principles (I; 4, 2)
Introduction to the concepts of material and energy balances and phase equilibria for chemical engineering processes. Introduction to problem-solving methodologies and computer simulation. Prerequisite: MATH 201.

210. Applied Mathematics for Chemical Engineering (II; 4, 0)
Mathematical modeling and methods. Topics include ordinary and partial differential equations, Laplace transforms, and matrices with analytical and computer solutions. Prerequisite: MATH 211 or equivalent.

300. Heat and Mass Transfer (I; 4, 2)
Conductive, convective and radiation heat transfer; analytical and numerical solutions of heat transfer problems, estimation of heat transfer coefficients, and heat exchanger design. Fundamentals of mass transfer (diffusion and convection) with applications to unit operations. Prerequisites: ENGR 233, CHEG 200 and CHEG 210.

302. Equilibrium Stage Processes (I; 2, 1) Half course.
Analysis of binary and multicomponent separations by analytical, graphical, and computer methods. Topics include gas absorption, distillation, liquid-liquid extraction as well as selected novel separation processes. Prerequisite: CHEG 200. Corequisite: CHEG 300.

310. Chemical Engineering Thermodynamics (II; 4, 0)
Laws of thermodynamics, thermodynamic properties of materials, equations of state, refrigeration and engine cycles, physical and chemical reaction equilibrium, and solution thermodynamics. Prerequisites: CHEG 302 and CHEM 341 or CHEM 343.

315. Unit Operations Laboratory (II; 1, 3) Half course.
A laboratory course in pilot-scale processes involving momentum, heat and mass transfer. Project definition, experimental operation, analytical procedures, data analysis, technical reports and oral presentations. Prerequisite: CHEG 302. Corequisite: CHEG 310.

320. Chemical Reaction Engineering (I; 3, 2)
Rate forms for homogeneous and catalytic reactions; isothermal and nonisothermal reactor design and analysis; interpretation of laboratory data; introduction to nonideal flow and residence-time distributions. Prerequisites: CHEM 341 or CHEM 343, CHEG 210, and CHEG 310.

330. Process Control (II; 3, 2)
Dynamics of open and closed-loop processes. Design, analysis and tuning of PID feedback control based on transient, Laplace domain, and frequency response methods. Instrumentation and computer-based data acquisition and control for chemical processes. Introduction to feedforward, cascade and advanced control strategies. Prerequisites: CHEG 300 and CHEG 302.

400. Process Engineering (I; 3, 3)
Applications of engineering, economic, environmental, and ethical principles in preliminary process design using computer aids such as process simulators. Problem definition, literature survey, flowsheet development, material and energy balances, equipment design, profitability analysis, oral and written communication. Prerequisites: CHEG 310 and CHEG 315.

410. Project Engineering (II; 3, 3)
Second of two Capstone experiences for chemical engineering majors. Students refine a general problem statement in order to plan, execute, and assess a project that achieves specified goals. Design, construction, and testing of an apparatus, system, or simulation. Problem-solving, teamwork, communication, professional development, and laboratory work are emphasized. Prerequisite: CHEG 400.

430 and 431. Chemical Engineering Project (I or II; R; 1, 5) Half course
Individual work with a faculty adviser on a development or design project beginning with a written plan and culminating with a deliverable product and a written report. Problem

analysis involving information synthesis, experimentation, mathematical modeling, or software development. Prerequisite: permission of the instructor.

440 and 441. Chemical Engineering Research (I and II; R; 1, 10)
Independent study with a faculty adviser on a research project. Submit a project proposal for group review, conduct the work, and culminate with a written and an oral presentation before a faculty group. Prerequisite: permission of the instructor.

444. Green Engineering (II; 4, 0)
Economic design of processes and products that reduce the generation of pollution as well as risk to human health and the environment. Risk assessment, evaluation and prediction of toxicity and fate of chemicals, and environmental performance analysis applied to chemical products and processes. Prerequisite: permission of the instructor.

450. Polymer Science (II; 3, 3)
Structure, characterization and properties of polymeric materials. Chemistry and kinetics of polymerization. Processing and application of polymers. Prerequisite: CHEM 341 or 343.

451. Applied Process Analysis (II; 4, 0)
Exploration of computer-assisted solutions of chemical processing problems in fluid flow, thermodynamics, heat and mass transfer, reaction kinetics, engineering design and economics. Application of software systems such as spreadsheet, symbolic processor, numeric computation and visualization environment, optimizer, and process simulator. Prerequisites: CHEG 320 and CHEG 400.

452. Bioprocess Engineering (I or II; 4, 0)
Survey course in biochemical engineering. Introduction to microbiology, biochemistry, cell metabolism and genetic control. Enzyme structure and function; enzyme kinetic mechanisms. Emphasis on the design of biochemical reactors and separation processes utilizing fundamental principles of kinetics, thermodynamics and heat, mass and momentum transfer. Prerequisite: CHEG 302. Corequisite: CHEG 320.

453. Product and Process Chemistry (II; 4, 0)
Examination of the internal structure of the chemical industry. The roles of key chemicals and intermediates in modern chemical synthesis will be emphasized to provide an overview of current industrial product methods. Product and process history, design and improvement will be covered through discussions, simulations and case studies. Prerequisite: permission of the instructor.

455. Atmospheric Chemistry and Physics (I or II; 4, 0)
Addresses the relationships of chemistry, physics, and engineering principles in understanding processes in the Earth's atmosphere. Topics include overview of the Earth's atmospheric history and problems of current environmental concerns including urban ozone, acid rain, particulate pollution, and global change. Prerequisite: junior or senior students majoring in chemistry, physics, or engineering with permission of the instructor.

457. Applied Colloid, Surface, and Nanoscience (I; 4, 0)
Exploration of the ways in which surfaces are different from bulk substances, and how this impacts processes such as illness, chemical processing, contaminant transport, and enzymatic activity. The topics discussed will be shaped by student interest. Prerequisite: permission of the instructor.

460. Biomaterials: Materials in Medicine (I or II; 4, 0)
Classes of biomaterials, their applications, and current trends in biomaterials research and technology. Medical/ethical implications of biomaterials development and research. Prerequisite: permission of the instructor.

470 and 472. Special Topics in Chemical Engineering (I and II; R; 4, 0)
Advanced, in-depth courses developed from areas of chemical engineering science or technology. Prerequisite: permission of the instructor.

481. Topics in Reaction Engineering (I or II; 4, 0)
Reactor design and analysis applied to specific systems. Complex chemical reaction networks with emphasis on nonideal flow and transport effects on heterogenous reactors. Prerequisite: permission of the instructor.

482. Topics in Chemical Engineering Applied Mathematics (I or II; 4, 0)
Analytical and numerical methods for ordinary and partial differential equations with problems drawn from chemical engineering. Topics include transform methods, matrix methods, weighted-residual methods, and finite differences. Prerequisite: permission of the instructor.

483. Topics in Chemical Engineering Thermodynamics (I or II; 4, 0)
Advanced study of thermodynamics applied to fluid flow, heat transfer, gas compression, air conditioning, refrigeration, and chemical equilibria. Prerequisite: permission of the instructor.

485. Topics in Transport Theory (I or II; 4, 0)
Mass, energy, and momentum transfer in continuous media. General equations of transfer developed and used to analyze real systems. Prerequisite: permission of the instructor.

Civil and Environmental Engineering (CENG)

Professors: Jeffrey C. Evans (Chair), Jai B. Kim, Richard G. McGinnis, James G. Orbison, Ronald D. Ziemian

Associate Professors: Richard D. Crago, Thomas D. DiStefano, Matthew J. Higgins, T. Michael Toole

Assistant Professors: Stephen G. Buonopane, Michael A. Malusis, Kelly A. Salyards, Xiaokun (Cara) Wang

300. Introduction to Structural Engineering (I; 4, 0)
Introduction to behavior, analysis, and design of structures; including design, criteria, loads, modeling of structural systems, design with various material types (e.g. steel, concrete, timber, masonry). Discussion of the design process, and societal and global context of structural design. Case studies used throughout the course. Prerequisites: ENGR 208 and ENGR 242.

305. GIS Applications for Engineering (I or II; 3, 2)
Introduction to basic concepts in geographic systems, spatial analysis, and their application in engineering. Students will learn to use GIS software for presenting and analyzing engineering problems. Prerequisite: permission of the instructor.

320. Water Resources Engineering (II; 3, 3)
Planning, design, and operation of water resources projects with emphasis on hydrology, hydraulic structures, and open and closed conduits; applications in stormwater management and water supply. Prerequisite: ENGR 222.

330. Introduction to Transportation (II; 3, 2)
Transportation systems, operations, planning, and design for highways and other modes; sustainability, safety, social, and economic issues; traffic studies in the local community.

340. Environmental Engineering (I; 3, 2)
An introduction to the fundamentals of environmental engineering and science such as chemistry, microbiology, mass balance, and reactor theory. Application of fundamental concepts to environmental engineering includes water quality, water and wastewater treatment, solid and hazardous waste, air pollution, greenhouse gases and global warming, green energy, and professional ethics. The course includes a hands-on laboratory component with a focus on experiential learning. Prerequisite: ENGR 222 or permission of the instructor.

350. Geotechnical Engineering I (I; 3, 2)
Origin, composition, structure, and properties of soils. Identification, classification, strength, permeability, and compressibility characteristics. Introduction to foundation engineering. Laboratory determination of soil properties. Prerequisites: ENGR 208 and ENGR 222 or permission of the instructor.

401. Structural Analysis (I or II; 3, 2)
Analysis of two- and three-dimensional structural systems using the direct stiffness method. Principles of virtual work will be taught and used as a basis for element formulations. Application and development of analysis software. Verification and interpretation of computational results. Prerequisites: ENGR 212, CENG 300 and permission of the instructor.

403. Wood Engineering Design Principles (I or II; 3, 3)
Wood properties as construction material; design of beams, columns, fasteners, and connections. Glued-laminated timber and many other uses for structures in accordance with the National Design Specifications. Form work for concrete structures, plywood and plywood diaphragms. Prerequisite: CENG 300 or permission of the instructor.

405. Design of Steel Structures (I or II; 3, 3)
Introduction to behavior and design of steel structures and elements, including tension members, compression members, beams, beam-columns, and connections. Limit states design philosophy is emphasized through the use of AISC specifications. Design loads according to contemporary standards and international building codes. Prerequisite: CENG 300 or permission of the instructor.

406. Design of Concrete Structures (I or II; 3, 3)
Introduction to behavior and design of concrete elements and structures: beams, columns, slabs, footings, bridges. Reinforced and prestressed concrete. Material properties and behavior, flexural and shear strength, serviceability and deflections. Use of relevant codes and specifications including ACI and AASHTO. Design loads according to contemporary standards and international building codes. Prerequisite: CENG 300 or permission of the instructor.

407. Prestressed Concrete (I or II; 3, 2)
Analysis and design of prestressed concrete members and structures: flexural stresses, flexural strength, shear strength, loss of prestress, deflections. Prerequisite: CENG 406.

408. Finite Element Methods (I or II; 3, 2)
Fundamental theory and applications for civil engineering, mechanical engineering, and engineering mechanics stress analysis problems. One-, two-, and three-dimensional elements, and axisymmetric elements, and their formulations; stress recovery techniques; modeling considerations; convergence criteria and error estimates, includes use of commercial and developmental finite element analysis programs. Crosslisted as MECH 467. Prerequisite: CENG 402 or permission of the instructor.

409. Earthquake Engineering (II; 3, 2)
Analysis and design of structures subjected to earthquakes. Single and multi degree-of-freedom systems, response spectra, seismology, soil dynamics. Seismic design methods in building codes. Isolation and energy dissipation systems. Laboratory to include experiments with shake tables. Prerequisite: CENG 300 or permission of the instructor.

419. Advanced Topics in Structural Engineering (I or II; 4, 0)
Topics will vary. Prerequisite: permission of the instructor.

421. Hydrology (I or II; 3, 3)
The interrelation of meteorological conditions, precipitation, surface runoff, and groundwater storage. Prerequisites: CENG 320 and permission of the instructor.

422. Open Channel Flow (I or II; 3, 2)
Steady flow with the continuity, energy, momentum and flow resistance equations; flow profiles; channel controls and transitions; introduction to unsteady flow. Prerequisites: ENGR 222 and permission of the instructor.

429. Advanced Topics in Water Resources Engineering (I or II; 3, 2)
Topics will vary. Prerequisite: permission of the instructor.

431. Introduction to Urban and Regional Planning (I or II; 4, 0)
Problems of urban and regional planning and the treatment of various factors of a comprehensive plan. Emphasis on the sustainability and interrelationships between engineering, sociology, geography, and economics. Prerequisite: permission of the instructor.

432. Transportation Policy and Planning (I or II; 4, 0)
Analysis of policy in a social and environmental context. Transportation supply, demand, and pricing. Evaluation of alternative plans. Analysis of transportation benefits and costs. Prerequisite: CENG 330 or permission of the instructor.

433. Mass Transportation Seminar (II; 4, 0)
A pragmatic analysis of mass transportation, its history, present condition, and future; emphasis on the social and economic aspects of transit. Prerequisite: permission of the instructor.

434. Innovative Transportation Engineering (AII; 3, 1)
Innovative concepts in transportation planning, design, and operation including context sensitive design, traffic calming, roundabouts, intelligent transportation systems, and geographic information systems. Prerequisite: permission of the instructor.

435. Travel Demand Modeling (I or II; 3, 2)
Introduction to current development of travel demand modeling, including the four-step method and its extensions, with brief introductory sessions on other integrated models.

436. Traffic Engineering (I or II; 3, 2)
Introduction to basic traffic engineering elements, including traffic flow theory, queue theory, geometric design and signal design. Students will learn to use traffic design and simulation software.

439. Advanced Topics in Transportation (I or II; 4, 0)
Topics will vary. Prerequisite: permission of the instructor.

440. Physical/Chemical Treatment Processes (I or II; 3, 3)
Fundamental principles of physical and chemical treatment processes used to treat contaminated water, air and soil such as ion-exchange, coagulation, sedimentation, filtration, air stripping, disinfection, adsorption, and membrane processes. Laboratory experiments are used to reinforce theory and to develop design criteria for full-scale treatment processes. Prerequisite: permission of the instructor.

441. Environmental Engineering Biotechnology (I or II; 3, 3)
Theory and design of biological waste treatment facilities for industrial, municipal, and hazardous pollutants, and natural biotransformation of pollutants in the environment. Kinetics of biological growth. Biological treatment of industrial wastes and bioremediation of hazardous wastes. Prerequisite: CENG 340 or permission of the instructor.

444. Hazardous Waste Management (I or II; 3, 3)
Toxicology and risk assessment, bioremediation, industrial waste pretreatment, stabilization techniques, facilities siting, secure landfill design, incineration, legal and liability issues, public participation, remedial action, and emergency response. Prerequisite: CENG 340 or permission of the instructor.

445. Environmental Engineering Chemistry (I or II; 3, 2)
Principles of aquatic chemistry and applications with emphasis on acid-base reactions, metal speciation and solubility, and oxidation-reduction reactions in water. Prerequisite: permission of the instructor.

448. Environmental Engineering Unit Operations and Processes (I or II; 3, 3)
Fundamental principles of physical, chemical, and biological treatment systems used in the treatment of air, soil, and water in the field of environmental engineering. The course focuses on coagulation, flocculation, sedimentation, filtration, gas/liquid transfer, adsorption, biological treatment, and the design and analysis of these technologies in environmental treatment process. Laboratory experiments are used to demonstrate and reinforce theory of these processes. Prerequisite: CENG 340 or permission of the instructor.

449. Advanced Topics in Environmental Engineering (I or II; R; 4, 0)
Prerequisite: permission of the instructor.

450. Geotechnical Engineering II (I or II; 3, 2)
Application of the theories and principles of soil mechanics to foundation design. Subsurface investigations; methods of analysis, design, and construction of foundations; bearing capacity and settlement of shallow and deep foundations; excavation and bracing; earth structures. Prerequisite: CENG 350 or permission of the instructor.

451. Environmental Geotechnology (II; 3, 3)
Interaction between hazardous and toxic wastes and geotechnical properties of soils. Remediation of the subsurface environment. Prerequisite: CENG 350 or equivalent or permission of the instructor.

452. Ground Improvement Engineering (I or II; 3, 3)
Application of soil mechanics principles to improving the engineering characteristics of soils. Includes mechanisms of soil stabilization, grouting, deep dynamic compaction, reinforced earth, sand drains, and preconsolidation. Prerequisites: CENG 350 and permission of the instructor.

459. Advanced Topics in Geotechnical Engineering (I or II; 4, 0)
Topics will vary. Prerequisite: permission of the instructor.

461. Design Loads for Buildings and Bridges (I; 3, 3)
Wind, snow, and seismic designs in accordance with ASCE/SEI 7-05 Minimum Design Loads, AASHTO 2007 LRFD Bridge Specifications, AISC 13th edition (2005), ACI 318-05 and NDS 2005. Prerequisite: permission of the instructor.

462. Steel Connection Analysis and Design (I or II; 3, 2)
Analysis and design of connections for steel buildings including shear, moment and bracing connections, bolted and welded connections. Prerequisite: CENG 405.

472. Construction Engineering (I; 3, 2)
Project documents, processes, and organizational structures. Construction estimating, equipment, labor, and procurement. Building methods and materials. Prerequisite: senior status or permission of the instructor.

475. Forensic Engineering (I or II; 4, 0)
Introduction to identification, evaluation, and analysis of a wide variety of engineering failures; failure investigation and the legal process; serviceability failure, material or system failure, design errors; expert witness testimony. Prerequisite: senior status.

479. Advanced Topics in Construction Engineering and Management (I or II; R; 1, 4) Half to full course.
Topics will vary. Prerequisites: CENG 472 and permission of the instructor.

480. Special Topics in Civil Engineering (I or II; R) Half to full course.
Individual projects in laboratory work, design, or library studies, depending upon the nature of the problem selected. Prerequisite: permission of the instructor.

481. Undergraduate Research (I and II; R) Half to full course.
Original investigations in structural engineering, transportation engineering, environmental engineering, geotechnical engineering, or water resources engineering.

490. Engineering Planning and Project Management (I; 3, 2)
Planning process including feasibility study, decision making, optimization concepts, engineering economy, and project scheduling, control and management. Prerequisite: senior status.

491. Civil Engineering Design (II; 2, 10)
A comprehensive design of a civil engineering project that integrates at least two subdisciplines of civil engineering. Projects are designed by teams of two to four students and must involve analysis and synthesis to produce design solutions that achieve the desired "client" needs within specified constraints. A weekly seminar series by practicing engineers and others focuses on ethics, professionalism, global issues, and engineering careers. Prerequisite: CENG 490.

Courses offered occasionally: 425 Groundwater Hydrology, 443 Environment and Microbes, 453 Advanced Soil Mechanics

Computer Science (CSCI)

Professors: Maurice F. Aburdene, Gary Haggard, Xiannong Meng (Chair)

Associate Professors: Stephen M. Guattery, Daniel C. Hyde, Jerud J. Mead, Patricia A.Wenner, Richard J. Zaccone

Assistant Professors: Luiz Felipe Perrone, Joshua Steinhurst, Lea Wittie

Students who wish to **major** in computer science may enroll in the bachelor of science in computer science and engineering curriculum (see page 255), in the bachelor of science curriculum (see page 58), or the bachelor of arts curriculum (see page 58).

The **minor** in computer science requires five computer science courses: CSCI 203, 204, 206, and two additional courses chosen from CSCI 208 or the 300-level computer science courses.

180. Introduction to a Microcomputer Environment (I and II; 3, 1)
Topics include the history of computers, hardware, software, file organization, data communications, systems analysis and design, programming, and societal issues. Labs use an operating system, a wordprocessor, a spreadsheet, and a programming language. Not open to computer science majors or students who have taken CSCI 203, CSCI 204, or who are enrolled in the College of Engineering.

203. Introduction to Computer Science I (I or II; 3, 2)
Fundamentals of problem solving in Java. Introduces program structures, object-oriented programming, algorithm design, computer organization, programming language syntax, semantics, and translation.

204. Introduction to Computer Science II (I or II; 3, 2)
Introduction to data structures and algorithms using an object-oriented approach. Topics include software-engineering principles, object-oriented programming, recursion, basic data structure, algorithm analysis, and team programming. Prerequisite: CSCI 203 or permission of the instructor. Corequisite: MATH 201 or equivalent.

206. Computer Organization and Programming (I or II; 3, 2)
Concepts of software and hardware. Software: instruction set design, assembly language and assemblers. Hardware: processor datapath and control, pipelined execution units, memory hierarchy, interfacing processors and I/O devices. Prerequisite: CSCI 204 or permission of the instructor.

208. Programming Language Design (I or II; 3, 2)
Study of modern programming language paradigms (procedural, functional, logic, object-oriented). Introduction to the design and implementation of programming languages including syntax, semantics, data types and structures, control structures, run-time environments. Prerequisite: CSCI 206.

240. Computers and Society (II; 2, 0) Half to full course.
The place of the computer in modern society. An in-depth study of the societal, ethical, and legal issues of computing. Historical as well as futurists' views of computing and technology. Public perception of computers and computer scientists and how that influences the role of the computer scientist as a professional. Course work includes oral and written presentations. Prerequisite: junior or senior standing.

278. Computer Science Individual Study (I, II, R; or S; 0, 6) Half to full course.
Independent study or project in computer science. Prerequisites: CSCI 180 or 203 and permission of the instructor.

305. Introduction to Database (I or II; 3, 0)
Relational database design methodologies, evaluation techniques, programming, and query languages. Introduction to database systems design, performance, and object-oriented databases. Prerequisites: CSCI 206 and junior standing.

311. Data Structures (I, 3, 1)
Introduction to the abstract data types: list, stack, queue, tree, set, and graph. Includes complexity analysis of the various implementations of an abstract data type. Prerequisite: MATH 241. Corequisite: CSCI 208 or permission of the instructor.

315. Operating Systems Design (II; 3, 2)
Introduction to operating system design including processor management, scheduling, memory management, resource allocation, file systems, and concurrency. Prerequisite: CSCI 208.

320. Computer Architecture (I; 3, 2)
Use hardware description language to describe and design digital systems. Processor design, pipelining, cache and storage systems. Instruction and thread level parallelism, speculation, branch prediction. Prerequisite: CSCI 206 or permission of the instructor.

335. Web Information Retrieval (I or II; 3, 0)
Introduction to information retrieval. Topics include retrieval models, evaluations, text properties, indexing, query operations, user interfaces, and web search. Prerequisites: CSCI 206 and junior standing.

341. Theory of Computation I (I; 3, 0)
Finite automata, regular sets, pushdown automata, context-free grammars. Turing machines, recursive functions and undecidability. Prerequisite: MATH 280 or MATH 241.

350. Introduction to Analysis of Algorithms (I or II; 3, 0)
Selected topics in algorithm design, analysis, and application. Possible topics include network flows, graphs, string processing, randomized algorithms, parallel algorithms, optimization, and NP-completeness. Prerequisite: CSCI 311.

355. Distributed Computing (I or II; 3, 2)
Design of distributed systems, including Internet-based. Topics include interprocessor communication; naming, services, and objects; concurrency control and security. Corequisite: CSCI 315 or permission of the instructor.

362. Computer and Network Security (II; 3, 0)
Fundamental principles of computer and network security. Topics include cryptology, privacy, secure programming, authentication, assurance, intrusion detection, and practical experience on networked Linux computers. Corequisite: CSCI 315.

363. Computer Networks (AII; 3, 2)
Topics in computer networks and distributed computing systems. Computer communications, hardware, and software, distributed operating systems, and application programs. Study of existing networks. Prerequisite: CSCI 315 or permission of the instructor.

367. Computer Graphics (II; 3, 2)
Topics in graphics hardware and software. Input devices and output displays and graphics processor architecture. Application packages, general purpose graphics packages, and algorithms. Use of color and software for two- and three-dimensional graphics. Prerequisites: junior status; CSCI 204 or permission of the instructor.

376. Computer Science Honors Thesis (I and II and S; R) Half to full course.
Independent work on computer science honors thesis. Prerequisite: permission of the instructor.

378. Individual Study in Computer Science (I or II or S; R) Half to full course.
Independent study in computer science. Recent areas include graph algorithms, computer security, distributed computing, graphics, programming languages, software engineering, web retrieval. Prerequisite: permission of the instructor.

379. Topics in Computer Science (I or II; R) Half to full course.
Current topics of interest. Course may or may not require laboratory depending upon the topic. Prerequisite: permission of the instructor.

475. Senior Design I (I; 2, 0) Half course.
A recognized software engineering methodology will be used with all phases of a senior design project. Written work will include a technical report about the project, a feasibility report, and a requirements specification document. Prerequisite: permission of the instructor.

476. Senior Design II (II; 1.5, 0)
Students will undertake several cycles of delivery, including (for each cycle), a design document, an implementation of the product, testing, and feedback. Students will produce a technical manual and a user's manual for the final version. Class presentations of the design versions and implementations will be given to obtain feedback. There will be a public presentation of the final product and design process. Prerequisite: CSCI 475.

479. Capstone Computer Science Design (I or II; 3,0)
Students in teams use software engineering methodology to design and implement a semester-long project. Written reports and presentations are required. Prerequisite: senior standing in the College of Arts and Sciences. Corequisite or prerequisite: CSCI 311.

Electrical Engineering (ELEC)

Professors: Maurice F. Aburdene, Richard J. Kozick (Chair), Edward J. Mastascusa

Assistant Professors: Susan Baish (visiting), Samuel E. Craig (visiting), David F. Kelley, Jie Lin, Kundan Nepal, Robert M. Nickel, Michael S. Thompson (visiting), Joseph V. Tranquillo, Chia-Jeng Tseng, Margaret G. Wismer

101. Electrical Engineering Analysis (II; 3, 2)
Introduction to concepts, voltage, current, signals, network elements, and Kirchoff's laws. Electrical measurements, energy and information generation, storage and transmission. Introduction to logic circuits and switching theory. Not for majors in electrical engineering. Corequisite: MATH 202.

105. Electrical Engineering Fundamentals (I and II; 3, 2)
Electrical measurement and physical quantities, sensors, sensor dynamics, filters, computer-controlled measurements, data storage and analysis, networked measurements. Corequisite: MATH 202.

120. Foundations of Electrical Engineering (II; 3, 3)
Introduction to the fundamental concepts of electrical engineering. Voltage, current, signals, electrical elements and their laws. Kirchoff's laws. Digital systems, logic design using FPGAs. Electrical measurements. Corequisite: MATH 202.

225. Circuit Theory I (I; 2, 3) Half course.
DC circuits, steady state analysis, impedance concepts, power. Corequisite: MATH 211. Prerequisite: ELEC 120 or permission of the instructor.

226. Circuit Theory II (II; 2, 3) Half course.
Transients, complex frequency, network function, Fourier series, Laplace transforms, two-port networks. Corequisite: MATH 212. Prerequisite: ELEC 225 or permission of the instructor.

228 and 229. Electrical Engineering Problems (I and II; R) Half to full course.
Problems in electrical engineering theory adapted to the needs of the student. Qualified juniors or sophomores by permission, or transfer students needing to meet special requirements.

245. Introduction to Digital Systems (I; 3, 3)
Analysis and design of digital systems. Boolean algebra and map simplification of logical functions. Combinational and sequential circuit designs. Laboratory experiments include design of digital systems using hardware components and computer simulation. Prerequisite: ELEC 101.

247. Microcontroller System Design (II; 3; 3)
The M68HC11 microcontroller is used to introduce basic concepts in computer architecture, assembly language programming, interrupts, and microcontroller interfacing. Prerequisites: ELEC 120 and CSCI 203.

308 and 309. Advanced Electrical Engineering Laboratory (I or II; R)
Special laboratory work for qualified seniors by permission.

320. Linear Systems (I; 3, 3)
Discrete and continuous signals; differential and difference equations; state equations; transform techniques (Z, Laplace, Fourier); analog and digital filters designs. Prerequisites: ELEC 226 and MATH 212.

340. Digital System Design (II; 3, 3)
Comprehensive introduction to modern digital design techniques. Combinational logic. Sequential logic. Finite state machines. CAD tools and algorithms. Programmable logic devices. Computer architecture. Prerequisite: ELEC 247 or permission of the instructor.

350. Electronics I (I; 3, 3)
Introduction to semiconductor components and circuits. Device physics, operation, modeling, and design applications of diodes, PN Junctions, bipolar, and field-effect structures. Prerequisite: ELEC 226.

351. Electronics II (II; 3, 3)
Device physics, operation, modeling and design applications of bipolar junction transistors and operational amplifiers. Microfabrication, amplifier design. Prerequisite: ELEC 350.

390. Theory and Applications of Electromagnetics (II; 4, 0)
Applications of Maxwell's equations to the solution of problems involving static electric and magnetic fields and transverse electromagnetic waves. Transmission line parameters, wave propagation, reflection from planar surfaces, boundary conditions, polarization, and electromagnetic properties of matter. Prerequisites: ELEC 226 and MATH 212.

400. Project Planning and Engineering Design (I; 3, 0) Half course.
Introduction to design, conceptual design, design evaluation, project planning and scheduling for Electrical Engineering Senior Design Project and development of design proposal. Prerequisite: senior status or permission of the instructor.

401. Electrical Engineering Honors Thesis (I or II; R) Half or full course.
Independent work on electrical engineering thesis. Prerequisite: permission of the instructor and Honors Council.

410. Biomedical Signal Processing and Instrumentation (I or II; 3, 0)
Basics of biomedical signal processing and instrumentation, general design principles. Semester-long project to design a device for use in a biomedical application. Teams conceptualize, design, and implement class projects using appropriate analog and digital instruments. Prerequisite: ELEC 320. Open only to electrical engineering seniors.

411. Neural Signals and Systems (I or II; 4, 0)
Introduction to neural signals and systems. Topics include neural physiology, models of action potential generation and synapse dynamics, neural networks and techniques of neural waveform analysis. Prerequisite: permission of the instructor. Crosslisted as BMEG 441.

420. Electrical Engineering Design (II; 0, 6)
This project-oriented course serves as a Capstone course for electrical engineering majors. The student is expected to develop, implement, and demonstrate a solution to a problem. The problem will be selected by the student in collaboration with the instructor. The student's contribution to the solution will be evaluated based on a written and an oral report. Students are expected to participate in local student paper contests. Prerequisites: senior status or permission of the instructor.

421. Computer Engineering Design (II; 0, 6)
This project-oriented course serves as a Capstone course for computer engineering majors. The student is expected to develop, implement, and demonstrate a solution to a problem. The problem will be selected by the student in collaboration with the instructor. The student's contribution to the solution will be evaluated based on a written and an oral report. Students are encouraged to participate in local student paper contests. Prerequisite: senior status or permission of the instructor.

428 and 429. Advanced Electrical Engineering Problems (I or II; R) Half to full course.
Problems in electrical engineering theory adapted to the needs of the student. Qualified students by permission.

442. Digital VLSI Circuit Design (I or II; 3, 3)
Introduction to digital integrated circuit design, from wafer fabrication through structured design techniques. Teams conceptualize, design, simulate, layout, extract, and verify small VLSI systems using appropriate CAD tools. Prerequisite: ELEC 340 or permission of the instructor.

443. High Performance Computer Architecture (I or II; 3, 0)
Topics include "good" computer architecture, RISC/CISC, pipelining, super-scalar, super-pipelining, out-of-order execution, speculative execution, virtual memory, caches, and cache coherence. Prerequisite: ELEC 247 or CSCI 206.

444. Advanced Digital Design (I or II; 3, 3)
Hardware description languages. High-level synthesis. Logic synthesis. Field-programmable gate-array architectures and applications. Prerequisites: ELEC 245 or ELEC 340.

445. Simulation (I or II; 3, 0)
Digital simulation of continuous systems; digital integration algorithms; simulation languages; discrete modeling and simulation of dynamic systems; and simulation of stochastic systems. Prerequisite: MATH 202, ELEC 120, CSCI 203, or permission of the instructor.

452. Power Electronics (AI; 3, 3)
Design and analysis of solid-state power conversion systems. Circuit theory, computer-based modeling, and analytical tools for efficient electronic conversion, control, and conditioning of electric power. Prerequisite: ELEC 320. Corequisite: ELEC 351.

460. Optoelectronic Materials and Devices (II; 3, 2)
Introduction to the principles and applications of optoelectronic devices, including compound semiconductors, LED's, lasers, photodetectors, waveguide couplers and modulators. Switching and logic devices. Prerequisite: ELEC 350 or permission of the instructor.

462. Fiber Optics Fundamentals (I or II; 3, 0)
Applications of Maxwell's equations, dielectric planner waveguides, optical modes in fibers. Fiber dispersion and loss mechanism. Optical fiber data transmission link and components. Fiber fabrication techniques. Prerequisite: ELEC 390 or PHYS 333 or permission of the instructor.

463. Introduction to Mechatronics (I; 2, 2)
Mechatronics is a multidiscipline technical area defined as the synergistic integration of mechanical engineering with electronic and intelligent computer control in the design and manufacture of industrial products and processes. This design-directed course will cover topics such as actuators and drive systems, sensors, programmable controllers, microcontroller programming and interfacing, and automation systems integration. Crosslisted as MECH 463.

470. Communication and Information Systems (I or II: 3, 0)
Digital and analog communication systems, modulation techniques, noise considerations, optimum receivers. Prerequisite: ELEC 320 or permission of the instructor.

471. Probability with Applications in Electrical Engineering (I or II; 4, 0)
Introduction to probability and statistics. Projects illustrate the relevance and importance of probability and statistics in electrical engineering. Probability axioms; disjoint and independent events; conditional probability; random variables; probability mass/density functions; expected value, mean, variance, and covariance; noise characterization; Gaussian random variables, least-squares estimation of parameters and random variables; electrical engineering applications. Corequisite: ELEC 320.

472. Digital Signal Processing (II; 3, 2)
Sampling A/D and D/A conversion; digital filters; recursive and nonrecursive designs, quantization effects; Fast Fourier Transform; spectral estimation; computer implementations; applications. Prerequisite: ELEC 320 or permission of the instructor.

473. Digital Speech and Audio Processing (I or II; 3, 3)
Theory and application of digital speech and audio processing. Topics include speech and audio (MP3) coding, artificial speech synthesis, automatic speech recognition, and audio effects. Prerequisite: ELEC 320 or permission of the instructor.

474. Digital Image Processing (AI; 3, 0)
Introduction to the basic concepts and technique of digital image processing. Characterization and representation of images. Image enhancement. Image restoration. Image analysis. Image coding and reconstruction. Prerequisite: ELEC 320 or permission of the instructor.

475. Computer Communication Networks (I or II; 3, 0)
An introduction to computer networking using the seven-layer Open Systems Interconnection model. Hands-on exploration of the data link, network, transport, and application layers. Prerequisite: junior status.

477. Topics in Wireless System Design (I or II; 3, 3)
Introduction to various aspects of wireless communication system design, including RF circuit design, antennas, radiowave propagation, and computer simulation. Prerequisites: ELEC 351 and ELEC 390 or permission of the instructor.

480. Electrical Control Systems (I; 3, 3)
System components: closed loop systems; stability from Nyquist and root locus viewpoints: performance, compensation techniques, sampled systems, Z-transforms. Prerequisites: ELEC 320 and 350.

481. Advanced Control System (II; 3, 3)
Nonlinear control systems; signal-flow diagrams; statistical design; sampled-data techniques. Prerequisite: ELEC 480.

483. Fuzzy Systems and Neural Networks (I or II; 3, 3)
Fuzzy logic and fuzzy control systems. Neural networks and adaptive fuzzy systems. Adaptive algorithms for neural networks. Prerequisite: MATH 212.

491. Electromechanical Energy Conversion (I; 3, 3)
Three phase power circuits, transformer circuits, rotating machines and equivalent circuits, power electronic switches, machine dynamics, motor generator control. Prerequisites: ELEC 350 and ELEC 390.

493. Electric Power Systems (I or II; 3, 0)
Analysis of power distribution, load control, economics of operation, symmetrical and unsymmetrical faults, stability, and issues in deregulation. Prerequisites: ELEC 226 and ELEC 390.

Mechanical Engineering (MECH)

Professors: James W. Baish (Chair), Keith W. Buffinton, Thomas P. Rich

Associate Professors: Christine M. Buffinton (visiting), Charles W. Knisely, Steven B. Shooter, Peter C. Stryker, Constance W. Ziemian

Assistant Professors: M. Laura Beninati, Charles J. Kim, Christopher Mordaunt, Charles Randow, Mala M. Sharma

151. Machining for Manufacturing Tech. (I; 2, 2) No credit.
Use to develop an understanding of the processes needed to produce manufactured parts. Emphasis on hands-on machining and fabrication.

202. Graphics for Design and Manufacture (II; 1, 2) Half course.
Graphical representation techniques for visualization and communication of mechanical engineering designs and concepts. Creation, storage, and manipulation of production drawings and 3-D geometric representations using state-of-the-art software.

213. Thermodynamics I (I; 4, 0)
Thermodynamic principles including properties of substances, the first and second laws of thermodynamics, efficiencies, power and refrigeration cycles. Prerequisites: MATH 201 and ENGR 214. Not open to students who have taken ENGR 200 or CHEG 310.

216. Thermodynamics II (II; 3, 2)
A continuation of MECH 213 with a focus on applications of thermodynamic principles including an extension of power and refrigeration cycles, psychrometrics, reacting mixtures and combustion, and other selected topics. Prerequisites: MATH 202, MATH 211, and MECH 213.

252. Dynamics (II; 4, 0)
Kinematic and kinetic analysis of rigid bodies in planar and/or three-dimensional motion. Absolute and relative analysis of displacements, velocities, and accelerations; force, energy, and momentum methods; analytical and computer simulated solution techniques. Prerequisite: ENGR 220.

302. Finite Elements in Analysis and Design (II; 3, 2)
Introduction to finite element methods (FEM) and commercial FEM software for design and analysis of mechanical components. Applications in mechanical and thermal component/system design. Prerequisites: MECH 202 and MECH 353.

312. Heat Transfer (II; 3, 2)
Principles and engineering applications of heat transfer by conduction, convection, and radiation. Prerequisite: MECH 313 or permission of the instructor.

313. Fluid Dynamics (I; 3, 2)
Fundamentals of fluid dynamics including integral and differential control volume analysis, conservation equations, dimensional analysis, incompressible inviscid flows, internal and external viscous flows. Prerequisites: MATH 212, MATH 226, and MECH 216. Not open to students who have taken ENGR 222 or ENGR 233.

353. Solid Mechanics (I; 3, 2)
Introduction to continuum mechanics for elastic and elastic-plastic solids. Torsional, bending, thermal and dynamic loading. Yield criteria, residual stresses, shakedown and stress concentrations. Prerequisites: ENGR 220 and MATH 212. Not open to students who have taken ENGR 208.

355. Manufacturing Processes (I; 3, 2)
Analytical and technological study of manufacturing processes, including metal deformation, casting, and cutting. Introduction to numerical control and CAD/CAM. Laboratory fabrication project and field trips. Prerequisites: ENGR 240 and MECH 202.

392. Mechanical Design (II; 3, 2)
Principles and techniques for creative design of machines in relation to specifications and user requirements. Design using a solid modeling CAD package. Prerequisites: MECH 252 and MECH 353 or permission of the department.

401. Senior Design I (I; 2, 2) Half course.
Emphasis on component design in areas of advanced mechanics and thermofluids. Student teams participate in design process which includes research, design formulation, and presentation. Prerequisites: MECH 302, MECH 312, MECH 355, and MECH 392, or permission of the department.

402. Senior Design II (II; 1, 2) Half course.
Emphasis on fabrication, instrumentation, testing, and presentation of mechanical or thermofluid components designed in MECH 401. Student teams will participate in presentation of their results. Prerequisite: MECH 401 or permission of the department.

403. Thermal Design (I; 3, 2)
Codes, standards, economic equipment selection. Piping, pumps, fans, coils. Mini-design projects. Individual heat exchanger design and presentation. Computer-aided design. Prerequisite: MECH 312.

405. System Dynamics (I; 3, 2)
Modeling and analysis of dynamic systems consisting of mechanical, electrical, fluid, and thermal elements. Frequency response methods. Sampled data systems. Experimental system identification. Prerequisites: MATH 212 and ELEC 105.

Elective Courses

The following courses are offered to seniors.

422. Advanced Energy Conversion (I or II; 4, 0)
Application of thermodynamic principles to alternate energy sources and advanced energy systems. Investigation of solar, geothermal, wind, tidal, and hydroelectric power and the operation of fuel cells, magnetohydrodynamic generators, and photovoltaic, thermoelectric, and thermionic devices. Open to seniors only. Prerequisites: MECH 216 and permission of the instructor.

424. Internal Combustion Engines (I; 4, 0)
Description of internal combustion engines, methods of evaluating performance, the thermodynamics of combustion, engine testing, and design. Prerequisites: MECH 216 and MECH 312 or permission of the instructor.

432. Compressible Fluid Dynamics (I or II; 4, 0)
Compressible flow, shock wave phenomena, potential flow, two-dimensional flow, numerical methods, acoustic wave propagation. Selected laboratory exercises. Prerequisites: MECH 213, MECH 313, and ENGR 214 (or equivalent) or permission of the instructor.

435. Aerodynamics (I or II; 4, 0)
Two dimensional flow theory; vortex and momentum theories of finite wings; viscous flows, boundary layers and drag; high lift devices; lectures augmented by wind tunnel studies. Prerequisites: MECH 313 or equivalent and permission of the instructor.

445. Engineering Acoustics and Noise Control (I or II; 4, 0)
Fundamentals of sound; instrumentation for noise measurement and analysis; sound sources; sound power; sound in enclosed areas; acoustic enclosures; muffling devices; vibration control; noise control of typical devices. Prerequisite: permission of the instructor.

446. Flow-induced Noise and Vibration (I or II; 4, 0)
Classification of flow-induced vibration; turbulence excitation; gust excitation; vortex shedding; galloping and stall flutter; flutter; impinging shear layers; cylinders and tube bundle vibrations; resonators and noise generation. Prerequisite: ENGR 222 or MECH 313 or permission of the instructor.

452. Advanced Dynamics (I or II; 4, 0)
Kinematics and dynamics of particles and rigid bodies. Degrees of freedom. Partial velocities. Generalized active and inertia forces. Kane's equation. Lagrange's equation. Numerical simulation of motion. Prerequisites: MECH 252 and permission of the instructor.

453. Robotics (I or II; 4, 0)
History, evolution, capabilities, and applications of robotic devices. Introduction to robot kinematics, dynamics, and control. Research into current topics in robotics. Development

and implementation of robotic operations using model and industrial robots. Prerequisites: MECH 252 and permission of the instructor.

460. Engineering Optimization (I or II; 4 0)
Applied methods of linear, nonlinear, discrete, and global optimization. Numerical techniques for constrained and unconstrained problems. Emphasis on engineering applications and solution methods using Matlab.

462. Computer Integrated Manufacturing (I or II; 4, 0)
Issues of integrated information in manufacturing systems. In-depth study of solid modeling. Computer control of manufacturing processes, computer-aided quality control, and computer-aided process planning. Prerequisite: MECH 355.

463. Introduction to Mechatronics (I or II; 4, 0)
Mechatronics is a multidiscipline technical area defined as the synergistic integration of mechanical engineering with electronic and intelligent computer control in the design and manufacture of industrial products and processes. This design-directed course will cover topics such as actuators and drive systems, sensors, programmable controllers, microcontroller programming and interfacing, and automation systems integration. Crosslisted as ELEC 463. Prerequisite: permission of the instructor.

464. Mechanism Design (I or II; 3, 0)
Design of traditional and compliant mechanisms. Topics include kinematics, analytical and graphical synthesis methods, and topics in research. Prerequisites: MECH 353, MECH 392, or permission of the instructor.

466. Applied Fracture Mechanics (I or II; 4, 0)
Fundamentals of fracture mechanics and its applications to the design of damage tolerant structures. Case studies in the fields of aerospace, pressure, vessels, rotating machinery, railroads, etc. Illustrating fracture mechanics principles in design. Prerequisite: permission of the instructor.

467. Finite Element Methods (I or II; 3, 2)
Fundamental theory and applications for civil engineering, mechanical engineering, and engineering mechanics stress analysis problems. One-, two-, and three-dimensional elements, and axisymmetric elements, and their formulations; stress recovery techniques; modeling considerations; convergence criteria and error estimates, includes use of commercial and developmental finite element analysis programs. Prerequisite: CENG 402 or permission of the instructor. Crosslisted as CENG 408.

468. Applied Finite Element for Mechanical Design (I; 2, 3)
Practical uses of finite element software for problems common in research and mechanical design. Applications include sub-structure modeling, contact problems, stress concentrations and crack defects, elastic-plastic problems, and problems with dynamic loading. Prerequisite: MECH 302 or permission of the instructor.

470. Engineering Composite Materials (I or II; 4, 0)
Fundamental composite mechanics, including micromechanics and laminated plate theory. Design and analysis of composite structures; composite manufacturing techniques; current research topics in composite area. Prerequisites: MECH 353 and permission of the instructor.

476. Biomechanics (II; 4, 0)
Principles of mechanics applied to biological systems. Background in anatomy, physiology, and cell biology will be presented. Mechanical behavior of hard and soft biological materials. Topics in cellular, cardiovascular, musculoskeletal, implant, and sport/motion biomechanics. Prerequisite: permission of the instructor.

481. Engineering Analysis (I or II; 4, 0)
Advanced topics in mathematics and its applications in engineering. Both analytical and computational techniques may be included. Topics will be helpful to students considering graduate school. Prerequisite: permission of the instructor.

485. Advanced Engineering Problems (I or II; R; 2, 3) Half to full course
An investigation under the direction of a staff member. Topics not covered in other courses may be studied in this course. Prerequisite: permission of the instructor.

486. Environmental Fluid Dynamics (I or II; 3, 0)
Environmental fluid flow in lakes, rivers, oceans, and the atmosphere; contaminant transport; mixing ; reaction and particle dispersion processes; applications to natural and engineering systems. Prerequisite: MECH 313 or ENGR 222 or ENGR 233.

Courses offered occasionally (open to qualified seniors): 421 Advanced Engineering Thermodynamics, 423 Thermal Environmental Engineering, 430 Advanced Heat Transfer, 431 Boundary Layers and Convection Heat Transfer, 433 Advanced Fluid Mechanics, 440 Turbomachinery, 441 Gas Turbines, 451 Vibration Analysis, 465 Advanced Mechanics of Solids, 484 Special Topics, 490 Form and Function

UNIVERSITY PROGRAMS

The Writing Program

As part of the undergraduate program, a student must successfully complete three writing-emphasis courses. These courses use writing to help students acquire both subject knowledge and writing ability. In these courses, students learn and communicate their knowledge through writing.

Writing-emphasis courses are intended to train students in writing across the disciplines throughout four undergraduate years. Therefore, the best plan is to take them in varied fields and to space them out.

These courses, designated as "W Courses," are offered in most departments. A complete list of W courses is available at the Writing Center's website, www.bucknell.edu/WritingCenter.

Not every course that contains writing, even a great deal of writing, will be a W course. W courses have certain characteristics:

1. A W course provides *writing instruction*. In writing and revising, students receive the help and advice of an instructor and perhaps writing tutors or students in the class. The writing instruction may take the form of written or oral responses to drafts and papers, but it also can be reading composition textbooks or discussing writing.
2. The course pays attention to and encourages the different stages of *writing as a process*: pre-writing or brainstorming, writing drafts, revising, and editing. Writing is treated as a dynamic process of expressing one's ideas in words and revising one's ideas and words by reconsidering them in light of feedback from others. Writing is, therefore, not merely a written end-product, but a tool for learning and thinking.
3. The course will teach the *conventions of writing* needed by students. These conventions vary from discipline to discipline and class to class. Students will be introduced to basic expository skills and the conventions appropriate to writing in the discipline of their choice.
4. In a W course, students *write frequently*. Writing frequently does not necessarily mean many assignments. Students may write multiple drafts of a few assignments. The point is that to improve one's writing, one must write. W courses provide the opportunity for practice and for the feedback so vital to writing well.
5. Students *write to learn* the subject matter of the course. Writing to learn takes many forms: notebooks, journals, answers to exam questions, laboratory reports, fieldwork reports, essays, and other formal and informal assignments. Students must understand the material in order to write about it, and that understanding emerges from trying to find words to communicate it to others.

Rules affecting the writing requirements are given on page 19 (for College of Arts and Sciences) or page 245 (for College of Engineering). This requirement is independent of the English requirement for the College of Engineering.

International Education

The Office of International Education's primary responsibility is to help provide an international focus to the academic life of Bucknell University students. The staff advises and assists undergraduate students in all majors who wish to incorporate an off-campus study experience into their academic work, by spending a semester, year, or summer in another country or on a specialized program in the United States.

Bucknell offers a variety of undergraduate study opportunities for students in Europe, Asia, the Middle East, Africa, Australia, New Zealand, and Central and South America. Both language and non-language majors are encouraged to consider a semester or academic year abroad when their curricular plans might be enhanced by such experiences.

Bucknell sponsors programs in Spain, France, Barbados, and England (described below) and enjoys formal relationships with the Advanced Studies in England in Bath; Associated Kyoto Program in Japan; Denmark's International Study Program; the Faculty of Engineering at the University of Nottingham in England; the faculty of chemical engineering at the University of Rovira i Virgili in Spain; IES (The Institute for the International Education of Students) in Austria, Australia, China, England, Germany, Ireland, Italy, and Japan; and the Swedish Program at the University of Stockholm. In addition, off-campus programs sponsored by other American colleges or institutions have been approved for Bucknell student participation. Within the United States, students may participate in the Duke University Marine Laboratory Program in North Carolina or semester internship programs in Washington, D.C., and Philadelphia.

When students qualify for any of these programs, they are regarded as enrolled at Bucknell University while off campus, allowing them to receive academic credit, to continue all financial aid (except work-study), and to maintain their place in their academic class. Students on Bucknell *en France* or Bucknell in London receive Bucknell grades and credits. Students on Bucknell in Barbados receive one or two Bucknell credits with grades and two or three transfer credits. Students on Bucknell *en España* will receive a half credit for the orientation course and their remaining credit as transfer credit. Students on all other programs receive transfer credits; no grades are posted on the Bucknell transcript. Bucknell charges all students on non-Bucknell programs on-campus tuition minus a special tuition credit which partially defrays the additional costs of off-campus study. Bucknell then pays the tuition component of the program costs whether that tuition is lower or higher than Bucknell's tuition. If the program tuition is lower, the differential amount remains at Bucknell and is applied to the same University expenses that tuition always covers. If the program tuition is higher, Bucknell pays the full amount to the program without charging the student for the extra cost. Students on non-Bucknell programs pay all non-tuition costs (e.g., room and board) directly to the program. These latter costs are detailed in Estimated Cost Sheets in the Office of International Education. Students on Bucknell programs will be charged on-campus tuition. Room and board charges vary by program.

Information and applications may be obtained in the Office of International Education. Because prior planning, deadlines, and appropriate arrangements are crucial, it is necessary to consult with the office's staff well in advance of the semester to be spent off campus. Specifically, applications must be completed in December or February by students who wish to be off campus during the fall semester and in April or September by students who wish to be off campus during the spring semester. Check with the Office of International Education for specific dates. Off-campus study during the semester or for the full academic

year is open to all eligible students. In order to gain approval, qualified students should demonstrate the academic appropriateness of their program choice.

Students proposing to pursue off-campus studies should have an excellent academic record, a history of good conduct, and, normally, a minimum grade point average of 2.80. Exceptions to the preceding may be considered where there is evidence that the student is capable of sustained academic effort of high quality in an academic environment that may lack close supervision. All requests for special consideration will be reviewed by the Director of International Education.

Juniors and first-semester seniors are eligible for off-campus study. The last semester of the senior year must be spent on campus if a Bucknell degree is desired. Only advanced language majors may be advised to go abroad as early as second semester sophomore year. Students may study off campus for two semesters and may earn maximum credit equivalent to four full courses for a semester and eight full courses for a full academic year. It should be noted that courses elected off campus must be pre-approved for transfer credit by the appropriate department chair and must be passed with grades of "C" or higher if credit is to be awarded. Before leaving campus, students must submit to the registrar a regular schedule indicating off-campus study rather than the usual on-campus courses.

Bucknell *en España*

Bucknell *en España* is a study abroad program for students majoring or minoring in Spanish, as well as for other students who have reached the level of language proficiency equivalent to Intermediate Spanish II (SPAN 105). Each semester a Bucknell faculty member leads a group of students to Granada where they live with host families selected for them. The program, administered by the Spanish department and the Office of International Education, is affiliated with the Universidad de Granada and its Centro de Lenguas Modernas. Bucknell students with more advanced levels of Spanish proficiency will enroll in courses in the *Estudios Hispánicos* program, choosing from a variety of disciplines, including Language, Culture, Literature, Art History, Music, History, Geography, Sociology, Political Science, Economics, Management, and Film. Students who have completed SPAN 105 or the equivalent but are not sufficiently advanced for *Estudios Hispánicos* will enroll in the *Cursos de Lengua y Cultura Españolas*, which offers courses in Language, Literature, Geography, History, Art History, and Culture. All qualified students who wish to study in Spain are expected to prepare for and participate in Bucknell *en España*; for those students who have not yet completed SPAN 105, another study abroad program appropriate to their level of proficiency will be available.

Courses approved by the student's academic adviser at Bucknell or the appropriate department director/chair will count toward their major.

Bucknell *en España* is open to Bucknell students in good standing who have completed Intermediate Spanish II (SPAN 105) or the equivalent. It is expected that Spanish majors will complete, at the minimum, SPAN 208 (Advanced Conversation and Composition) prior to departure, although it is recommended that they take at least one course in literature or culture (SPAN 220, 222, 270, 280, 285) before going on the program. This will help to ensure their acceptance into the advanced *Estudios Hispánicos* program. Students who have completed at least SPAN 105 qualify for the *Cursos de Lengua y Cultura*. For students who are considering a second major or a minor in Spanish, the courses taken in *Lengua y Cultura* also count toward either. In addition to the language requirement, factors

determining a student's acceptance to Bucknell *en España* include her/his grade point average, motivation, maturity and independence, integrity and responsibility.

The tuition for Bucknell *en España* is the same as tuition on campus. The tuition charge includes a round-trip ticket on a group flight out of New York and excursions in Spain. Room and board fees are determined by current rates in Granada and are similar to Bucknell rates. Payments for tuition, room and board will be billed by the University and will be due at the same time as for on-campus students.

Applications for fall and full year are due in early February, and those for spring semester are due by mid-September. Application forms are available in the Office of International Education.

Bucknell *en France*

Bucknell *en France* provides an opportunity for qualified Bucknell University students regardless of major to complement their education by studying for a semester or a year in France. The program is administered directly by the French and Francophone Studies program and the Office of International Education in cooperation with the *Université François Rabelais* in Tours, France. All students who wish to study in France are expected to prepare for and participate in Bucknell *en France.*

Students remain officially enrolled at Bucknell and at the same time are registered as students in the French university. Their courses are taught in French, integrated into the Bucknell curriculum, and receive Bucknell grades and credit. Courses approved by the student's adviser count toward the major or minor. Course offerings, which vary slightly from year to year, usually include language, literatures, history, art history, economics, management, and political science. Courses in other disciplines may be arranged by independent study. The first month is spent in intensive study of French at the *Institut de Touraine.*

Bucknell *en France* is open to all Bucknell students in good standing who have completed FREN 150. Although not required, FREN 230, FREN 231, FREN 270, and FREN 271 are recommended in preparation for study in France. Students who do not meet the minimum language requirements for the regular Bucknell *en France* program can be placed in the *Institut de Touraine* in the fall for a semester of intensive French. While no minimum grade average is required, letters of recommendation must give evidence that the student has the maturity, integrity, independence, and responsibility necessary for study abroad.

Students who have completed a regular fall semester program in Tours can take advantage of their improved language and cultural skills to participate in more advanced or specialized options during the spring. Remaining in Tours, they may take one or more courses at *Université François Rabelais*, *Ecole Supérieure de Commerce,* or *Ecole d'Ingénieurs de Tours,* and they have the opportunity to do an internship in a business or public office. They also have the opportunity to apply for participation in approved institutes in Paris, or study in another French-speaking area such as Cameroon, Martinique, or Quebec.

The fee for Bucknell *en France* is the same as Bucknell tuition and the housing fees are the same as equivalent accommodations on campus. In addition to the courses, the fee covers the round-trip trans-Atlantic airfare and excursions in France. Student grants and loans apply.

Brochures and application forms are available at the department of foreign language programs, the Office of International Education, or from any French professor. Applications are due in mid-September for the spring semester and in mid-February for the fall semester.

Bucknell in Barbados

The Bucknell in Barbados semester allows students to live and study in a developing country, experience its culture, and interact with peers from Caribbean nations. The program takes place each spring semester at the Cave Hill Campus of the University of the West Indies (U. W. I.), about three miles from Bridgetown, the capital of Barbados. It is administered by a Bucknell professor-in-residence who offers a core course in which all students are expected to enroll. Students also are expected to enroll in three courses of their choice at the University of the West Indies. The range of choice is broad, and courses may be selected from the humanities, social sciences, natural sciences, and law. Students have the option of substituting a 10-hour per week internship for one of their three elective courses. Bucknell students have interned with various UN agencies, the Central Bank of Barbados, the Caribbean Development Bank, the Caribbean Tourism Organization, the Barbados Institute of Management and Productivity, the Caribbean Centre for Development and Administration, and the Bellairs Research Institute of McGill University, a marine biology institute. Bucknell in Barbados is open to all Bucknell University juniors and, in exceptional circumstances, sophomores who are in good academic standing. Applications are available in the Office of International Education and are due in mid-April.

Bucknell in London

Bucknell in London, offered every fall semester to qualified juniors and seniors, is taught by two Bucknell professors and one or more visiting British academics. The curricular emphasis of the program, which has ranged from anthropology, biology, classics, English, music, political science, and sociology to computer science and civil and environmental engineering, will vary according to the disciplines of the two professors who co-direct each fall semester's Bucknell in London. Since all courses are designed to take full advantage of the program's British location, numerous day and overnight field trips to sites in London and outside London are organized to complement various classes. Students select four courses from among the five or six offered. All courses receive Bucknell University grades and credit. Students are housed in flats in central London. Applications, due in mid-February, are available in the Office of International Education or from the two prospective faculty directors.

Summer Opportunities

In addition to semester and year-long programs, Bucknell also offers several faculty-led summer programs. Summer programs in Barbados, Northern Ireland, and the Virgin Islands are offered on a regular basis. In addition, Bucknell faculty periodically lead summer programs to other locations, which have included such destinations as Argentina, China, England, and Nicaragua. Eligibility requirements vary. Students seeking more information are encouraged to contact the program directors or the staff member in the Office of International Education responsible for summer programs.

Extended Academic Programs

The Humanistic Scholars Program

The Humanistic Scholars Program offers the opportunity for Bucknell University students to do sustained work in the humanities in a campus environment that is supportive of high achievement. Small classes, close contact with faculty, and a residential component are among the many attractive features of the program. Students in any major or degree program are welcome to participate. Completion of the Humanistic Scholars Program is noted on the student's transcript.

During their first year, students who wish to enter the Humanistic Scholars Program enroll in the Humanities Residential College, where they take two courses, one each semester, that constitute prerequisites for future work in the program. These courses are the Foundation Seminar "Myth, Reason, Faith" which deals with biblical, Greek, Roman, and medieval texts, and "Art, Nature, Knowledge" which deals with works of music, art, literature, philosophy, and science from the Renaissance to the 19th century. During their first year, Scholars participate in Common Hours where they discuss and formulate the questions for an optional comprehensive exam to be taken at the end of their first year. Passing the comprehensive exam will qualify students to continue as Humanistic Scholars.

In their sophomore year, Scholars enroll in a third course, "Nihilism, Modernism, Uncertainty." This course deals with issues in the 20th century with examples from art, music, literature, philosophy, and science. As in the first-year courses, the enrollment is kept small enough to encourage discussion and intellectual engagement. All of the courses in the Humanistic Scholars Program are team taught and include many guest lecturers from a variety of disciplines.

During the junior year, Humanistic Scholars are strongly encouraged to study abroad for at least one semester. During the senior year, they write a thesis in the department or program of their major.

Participation in the Humanistic Scholars Program is also possible for sophomores who may have missed the opportunity to enroll in their first year. The courses are identical with the above description.

Courses in the Humanistic Scholars Program fulfill certain Common Learning Agenda and other requirements, depending on the student's degree program. Students must apply and be accepted by the normal University procedure in order to study abroad. Registration for independent study leading to a senior thesis or honors thesis requires permission from the department of the student's major; it is the student's responsibility to obtain permission from a faculty sponsor for the thesis. For an honors thesis, it also is necessary to have the project approved by the Honors Council.

The Justice and Social Change Program

The Bucknell Program in Justice and Social Change strives to create a four-year intellectual and social community among students and faculty interested in issues of justice, social problems and social change at the local, national, regional and global levels. The goal of the program is to provide intellectual substance to and a supportive community for the notion that we must "think globally and act locally." Students in the program enjoy an ongoing relationship with faculty who have designed the program and participate in cocurricular

activities. Students from any major or program are welcome to participate. Students who are interested should contact the Academic Coordinator of the Residential Colleges.

Students ordinarily join the program after enrolling in the Social Justice College or Global College of the Residential College program for first-year students. During registration period in the fall of the first year, and as late as the beginning of the spring semester of the first year, students join by registering for the designated spring semester course. Students who were not enrolled in the Residential Colleges are eligible to join the program at this time, subject to approval by the coordinating committee that administers the program.

The two core courses for the program are POLS 276 Global Justice and Social Change and UNIV 219 Peace Studies. Students in the program enroll in one of these courses (depending on which is offered) during the second semester of the first year. During the sophomore year, it is expected that students will live together in a residence hall (a hall or house, depending on the size of the program) which is reserved to Justice and Social Change participants, linked to the first-year Social Justice and Global Colleges through a variety of programs, and staffed by a Resident Fellow who is responsible for linking the academic, living, social and programmatic environments.

During the fall semester of the sophomore year, students enroll in the other core course, either UNIV 219 or POLS 276 (depending on which course is offered). During the spring semester of the sophomore year, students enroll in one of a set of domestically oriented social justice/change courses. Courses previously approved for the program include ECON 236 Unemployment and Poverty, GEOG 223 Gender and Geography, SOCI 213 Race in Historical and Comparative Perspective, SOCI 243 Sociology of Race and Ethnicity or ENGL 228 Topics in Gender Study. The coordinating committee will publish a list each year of approved courses.

During the junior year, students are encouraged to study off campus for at least one semester in a program that offers courses on the themes of justice and social change. Students must apply and be accepted by the normal University procedure in order to study off campus. If a student is unable to study off campus for academic or personal reasons, then she/he will undertake a semester or summer internship in a social change organization, either for credit, under the rubric of the nontraditional course program, or not for credit.

During the senior year, students undertake a culminating experience which can take one of several forms: a thesis, a seminar, or a project, some of which might satisfy the Arts and Sciences College Capstone requirement. Registration for independent study leading to a senior thesis or honors thesis requires permission; it is the student's responsibility to obtain permission for a faculty sponsor for the thesis. For an honors thesis, it is also necessary to have the project approved by the Honors Council. During the spring semester of the junior year, students in the program propose a mechanism for satisfying the culminating experience to the coordinating committee of the program. During the second semester of the senior year, students participate in a common hour, which meets a number of times during the semester, to present their ongoing work to other students in the program. Participation in this common hour is necessary to successfully complete the Justice and Social Change program. Completion of the program is noted on the Bucknell transcript.

Graduate Studies

Bucknell University grants master's degrees in animal behavior, biology, chemistry, education, engineering (chemical, civil, electrical, environmental, and mechanical), English, mathematics, and psychology. Five-year coordinated bachelor's and master's programs are provided in biology, chemistry, and engineering. The professional degree in education provides for focused study in seven established areas of specialization: elementary and secondary principalship, supervision of curriculum and instruction, school superintendency (letter of eligibility), elementary and secondary counseling, school psychology, college student personnel, and instructional specialist.

Students are admitted to graduate standing by the director of graduate studies, from whom the *Graduate Studies Catalog* and application material may be obtained. The *Graduate Studies Catalog* and applications for admission and graduate financal aid are also located on the web at www.bucknell.edu.

The regular undergraduate student who has arranged to complete all undergraduate degree requirements may, with prior approval, take up to two courses for graduate credit. An application for graduate credit by an undergraduate student may be obtained from the Office of Graduate Studies or the Office of the Registrar.

Non-degree students who hold a bachelor's degree and wish to enroll in undergraduate courses may apply to the post-baccalaureate enrichment program. Application to the post-baccalaureate enrichment program is made through the Office of Graduate Studies. If non-degree students wish credit and transcript verification of their enrollment, they are required to pay per course tuition fees; if non-degree students do not wish credit, they are advised to audit the course(s) and are required to pay only audit fees. Non-degree students wishing to enroll in graduate courses must apply to the Office of Graduate Studies.

Summer Session

Bucknell University provides a six-week summer session offering regular, full-credit Bucknell courses, off-campus study courses, and programs in professional education. The summer session serves both undergraduate and graduate students who choose to take summer courses in order to enrich their educational experience or to accelerate their degree progress at Bucknell or elsewhere.

Bucknell's summer session offers courses across the curriculum. Students who are working toward degrees or certification are advised to consult with their advisers to determine which summer courses most appropriately meet their needs. Students also are encouraged to explore new interests and to develop new skills and areas of expertise which will serve them well in any career path or interest pursuit. One of Bucknell's goals is to provide the means for fostering the growth and development of a lifelong commitment to learning.

College of Arts and Sciences

The College of Arts and Sciences offers courses across its divisions: in the humanities, social sciences, natural sciences, and mathematics. Courses are available at introductory and advanced levels. Many departments also will arrange independent study courses.

College of Engineering
The College of Engineering also offers a number of regular courses, including at least one general course in engineering science. Courses in independent projects and special problems can be arranged in all departments of the college: chemical, civil and environmental, electrical, and mechanical. Students with specific needs for work in engineering during the summer should consult with their advisers or chairs of the appropriate departments.

Independent Study
Most departments in both colleges offer independent study or special project courses which permit students, in consultation with members of the faculty, to develop a course of study tailored to their individual needs. Arrangements for such courses should be made as early as possible in order to assure that a faculty member willing to direct the student's study will be available during the summer.

ACADEMIC REGULATIONS

Awarding degrees is based on requirements established by the faculty. The faculty also has adopted additional rules and policies related to those requirements that support the standards and the integrity of Bucknell and its academic program.

DEGREE AND GRADUATION REQUIREMENTS

Quantitative: Every candidate for the degree of bachelor of arts, bachelor of science, bachelor of science in business administration, bachelor of science in education, or bachelor of music must earn credit for 32 courses, while every candidate for a degree in the College of Engineering must earn credits for 34 courses including four half courses. Every candidate for the combination degree of bachelor of science in one of the branches of engineering and bachelor of arts must earn credit for 42 courses.

Curricular: Every candidate for any undergraduate degree must complete the curricular requirements as specified for the degree, including major requirements, major related requirements, general education requirements (i.e., the provisions of the Common Learning Agenda for students in the College of Arts and Sciences), and the University writing requirement. Substitution for, or waiver of, any requirement must be approved in advance by the dean of the student's college.

Grade Point Average: Every candidate for a bachelor's degree must have a cumulative grade point average of 2.00. In addition, every candidate for an engineering degree or for the combination degree of bachelor of science in one of the branches of engineering and bachelor of arts must have a cumulative grade point average of 2.00 for all courses in the College of Engineering.

ACADEMIC POLICIES AND REQUIREMENTS

Degrees and majors: It is possible to receive only one undergraduate degree from Bucknell University at a time; that is, each degree requires the fulfillment of all requirements and the full 32 (for Arts and Sciences), 34 (for Engineering), or 42 (for the combined Engineering/Arts degree) course credits. It is possible, however, to formally declare a second major, even if that major is from another degree program. If declared, the pursuit and successful completion of the second major, even if from another degree program, will be noted on the student's academic record (transcript). If the two majors are in different degree programs, the student can choose which degree to receive, but can receive only one degree.

Second degree: As noted above, normally only one undergraduate degree may be received. However, students who have received one baccalaureate degree, whether at Bucknell University or elsewhere, may seek a subsequent, second baccalaureate degree in a different curriculum by applying to the dean of admissions; acceptance requires the approval of the dean of the college and the dean of admissions. To be accepted as a candidate for a second baccalaureate degree, the new program must be fundamentally different from the first and must be judged by the University to be educationally necessary. The second degree program must require at least two years of academic work (16 course credits). All requirements for the second degree, including the major and general education requirements, must be fulfilled if the appropriate courses were not taken previously; coursework for the second degree must include the number of courses required by the major (which may include

electives in the major if some of the requirements were taken previously); all additional course credits must be taken in residence.

Eight-semester requirement: Students are expected to meet all degree requirements within eight semesters (including semesters on approved programs off campus and semesters elsewhere for transfer students) and ensuing summers. Only in exceptional circumstances will the dean of the student's college approve an extension to nine semesters of study. In some degree programs, a fifth year of full-time study may be required if a student fails to earn passing grades in all required courses and achieve the minimum GPA necessary for graduation at the end of his or her senior year.

Courseloads and full-time status: The normal courseload is four course credits. All degree candidates, including seniors, are expected to be enrolled each semester as full-time students, carrying a minimum of 3.0 and a maximum of 4.5 course credits, regardless of the number of course credits previously earned or planned for the future.

Exceptions for fewer course credits, and therefore part-time status, are made only in most unusual circumstances, such as severe health difficulties or nontraditional status such as that of a regular full-time University employee. Such underloads must be approved by the dean of the student's college.

Exceptions for more course credits, or **overloads,** must be approved by the dean of the student's college. Such approval will be given only when the student previously has demonstrated superior performance and mastery of the material in a normal courseload.

Residence requirement: All candidates for a degree are required to be in residence for a minimum of two semesters during the junior and senior years, including the final semester. Transfer students must be in residence for a minimum of three semesters, earning a minimum of 12 Bucknell course credits, regardless of the number of credits earned elsewhere previously.

"Double counting" courses toward requirements: Some courses which are used to fulfill Common Learning Agenda requirements also may be used to fulfill other Common Learning Agenda requirements. (See the Common Learning Agenda Summary, page 20.)

Courses which fulfill general education requirements (the Common Learning Agenda requirements in the College of Arts and Sciences) also may be used to fulfill major or minor requirements. However, courses cannot be counted in more than one major or minor; where one major or minor course satisfies the requirement in another major or minor, it must be replaced by an elective in the second major or minor. Major related requirements may be counted toward another major or minor.

Advising: Faculty and administrative advisers stand ready to consult with each student regarding the academic program. (The faculty adviser's signature is required for the initial course registration each semester and for most subsequent changes.) In addition, the registrar periodically provides the student with an Academic Progress Report. However, it remains each student's responsibility to fulfill all requirements for the major and the degree.

ACADEMIC STANDING

All students are expected to earn and maintain good academic standing as has been defined for their class. To be in good academic standing (and to be eligible for continued enrollment) students normally must pass a minimum number of courses and earn a minimum cumulative grade point average as follows:

Beginning of Semester	Minimum Number of Courses Passed *(Arts and Sciences)*	*(Engineering)*	Cumulative Grade Point Average
2	3	3	1.80
3	7	7	1.80
4	11	*	1.90
5	15	*	1.90
6	19	*	2.00
7	24	*	2.00
8	28	29.5	2.00

*Students must have earned within one (1) course credit of the credits required for their curriculum (See pp. 247-260).

At the conclusion of the spring semester, the dean of the student's college determines the eligibility of students to continue into the next academic year.

1. Students who have earned the minimum grade point average required but who have not passed the minimum number of courses required are placed on "**credit warning.**" Such students must make up their credit deficits either by attending the Bucknell University summer session or by attending another accredited institution in the summer. In the latter case, prior approval of both the institution and the course(s) must be obtained from the student's adviser, the Bucknell department chair in which the course would most appropriately fit, and the registrar.
2. Students who have not earned the minimum grade point average required are either subject to **dismissal** from the University or, if the average is close to the minimum, are placed on University "**grade point warning**." Students on warning are required to attend the Bucknell summer session and to earn sufficiently high grades so as to reduce significantly their grade point deficits before the beginning of the next academic year.
3. Engineering students who have not met the minimum grade point average in all courses in the College of Engineering are placed on "**engineering grade point warning,**" and may be required to attend the Bucknell University summer session to earn sufficiently high grades so as to reduce significantly their engineering grade point average deficit or may be subject to dismissal from the engineering degree programs. Minimum engineering grade point averages are: 1.80 at the start of the third semester, 1.90 at the start of the fourth semester, and 2.00 at the start of the fifth and subsequent semesters.

The dean of the student's college also will review academic records at the conclusion of the fall semester.

1. Students who have a credit deficiency will be notified by the dean of the student's college that they are not in good academic standing, and will be placed on "**credit warning.**" Such credit deficits will need to be made up during the following summer (see above) at Bucknell University or elsewhere.

2. Students who have a cumulative grade point average below that required at the end of the academic year – that is, 1.80 for first-year students, 1.90 for sophomores, and 2.00 for juniors – will be notified by the dean that they are on "**grade point warning**" or are advised to withdraw, or are subject to **dismissal,** depending upon the severity of the difficulty. (Continuation of a grade point deficiency could well lead to required summer school at Bucknell or dismissal at the end of the spring semester).
3. Seniors must be in good standing (both in terms of grade point average and passed courses) in order to be eligible to enroll in the final semester.
4. Engineering students who have not met the minimum grade point average in all courses in the College of Engineering are placed on "engineering grade point warning" and may be advised to withdraw, or may be subject to dismissal, depending on the severity of the difficulty. Minimum engineering grade point averages are 1.80 at the start of the third semester, 1.90 at the start of the fourth semester, and 2.00 at the start of the fifth and subsequent semesters.

All of the foregoing provisions are those normally followed in instances of grade point or credit deficits. However, it should be noted that occasionally a student may be technically in good academic standing and yet be subject to academic dismissal. Such instances might include a disastrous performance in the most recent semester and/or a pattern of decline in performance over several semesters. Similarly, grade point or credit deficiencies may be so great as to eliminate the possibility of continuation "on warning" either in a spring semester or during the summer.

Conversely, in exceptional circumstances, the definition of normal progress toward the degree in terms of passed credits may be altered by the dean of the student's college to allow a student to extend his or her undergraduate career to nine semesters.

Students frequently are well advised to consider withdrawing from the University if academic difficulty persists or seems likely to occur. Consultation with staff in the office of the dean of the student's college may be helpful in such instances.

It is the prerogative of the deans of the colleges to dismiss a student from the University at any time, or to place a student on "warning" for one semester or longer, for academic reasons.

In all matters pertaining to academic standing, the decisions of the deans of the colleges will be final.

If a student is dismissed for academic reasons, **readmission** consideration may not be given until one calendar year has passed. Readmission is not automatic; such will be considered only upon formal request, and will be approved only if there is substantial evidence that return is likely to be successful, including the reasonable expectation of earning good standing. Requests for readmission consideration must be submitted to the dean of admissions and must be approved by the dean of the student's college.

REGISTRATION, ENROLLMENT, AND WITHDRAWAL

Registration and Enrollment

Course Registration: Registration must be for a specified number of courses. Regardless of the number of course credits previously earned, degree candidates must elect at least the

minimum number of three courses required each semester. The faculty adviser's signature is required for the initial schedule each semester and for subsequent changes.

Course cancellation: The University reserves the right to cancel any course for which fewer than six students are registered, or for other cogent reasons.

Courses that may not be elected for credit: No credit will be given (nor may a second grade be earned) for a course previously passed or for a course with content similar to one previously completed. (A list of such cross-listed courses is published in each semester's *Schedule of Classes*.) In addition, courses that have been audited may not be taken subsequently for credit. Language courses which are below the student's language placement may not be elected for credit unless, in extenuating circumstances, authorized by the language department chair (or program director) and the dean of the student's college.

Military science: In addition to electing courses for credit each semester, a student may elect the basic course in military science of the Reserve Officers Training Corps. In the College of Arts and Sciences, there is no credit for such coursework. In the College of Engineering, credit for one elective course may be granted for the satisfactory completion of the advanced course in military science; request for such credit must be made to the dean.

Auditing: By definition, it is not appropriate to enroll as an auditor for courses involving studio art, dance, sign language, independent study, thesis preparation, or for any course requiring extra time and attention from the instructor. Note that courses that have been audited may not be taken subsequently for credit.

Regularly enrolled, full-time undergraduate students may carry audits in addition to their regular course load without additional charge. For any audit by all other students, the course audit fee is charged.

Financial obligations: No student will be enrolled or graduated, and no student will be given a transcript of record, until all accounts have been paid or satisfactory arrangements have been made with the Office of Finance.

Several plans for payment of tuition and other charges are available. Students and parents receive information about these plans directly and make arrangements with the organization of their choice.

Adding and dropping courses (first two weeks of semester): Students may add and drop courses, subject to space availability, during the first two weeks of the semester.

Withdrawal from courses, withdrawal from the University, Leave of Absence

Withdrawal from (dropping) courses: Students may withdraw from a course **during the usual two week drop/add period** by filing a completed Drop/Add form with the registrar. If another course is not added, the remaining course load must be no less than the minimum required three course credits and normal progress toward the degree will be considered. Reducing the course load to three course credits requires the approval of the faculty adviser and academic dean. (Financial aid packages are not likely to be extended or redefined to cover extra summers or semesters when the student elects a less-than-average course load, thereby requiring additional periods of enrollment. Questions

concerning the Financial Aid ramifications of "less-than-average course loads" should be pursued directly with the Office of Financial Aid.)

After the usual two-week drop/add period, all course withdrawals must be approved by the student's academic dean. In unusual circumstances dropping a course may be approved **through the fourth week** of the semester if the student is still carrying three course credits; in two semesters, as exceptions to this four-week limit, dropping a course may be permitted **through the 10th week** of the semester. The grade of "W" is assigned for all such approved course withdrawals after the first two weeks of the semester.

Exceptions to these deadlines may be approved only if there are serious health difficulties or similar extenuating circumstances. Poor performance, anticipation of poor performance, extracurricular obligations, changes in educational plans or interests, or the existence of extra course credits, are not considered extenuating circumstances.

Voluntary withdrawal from the University and readmission: A student who is unable to meet the demands of an academic program **during a semester**, due to personal or health reasons, should contact the office of the dean of the appropriate college to discuss possible options. Such a student may be well advised to consider a voluntary withdrawal. Withdrawals after the second week of the semester will result in the recording of WP or WF grades for each course. (See the System of Grading, page 302.) Withdrawals after the semester begins will result in the loss of some or all tuition. (See Deposits and Refund policies, page 308.)

A student who does not plan to continue at the University, for whatever reason, **at the conclusion of a given semester,** should be referred to the office of the dean of the appropriate college to complete the necessary forms for effecting a voluntary withdrawal.

A student who withdraws from the University during a semester or at the end of a given semester may apply for **readmission**. A written request should be sent to the associate dean of his/her college before June 1 for the fall semester, or before November 1 for the spring semester. Normally, a student who withdraws during a semester, but after the first four weeks of the semester, will not be considered for readmission for the next regular semester.

Health withdrawal and readmission: A student who withdraws for approved health reasons, as certified by the director of the student health service or the director of psychological services, and approved by the student's academic dean, must submit a request for readmission to the associate dean of his/her college by June 1 for the fall semester and by November 1 for the spring semester. Further, the student also must submit a request for return to the appropriate health director (i.e., student health service or psychological services) not less than two months before the beginning of the semester. This request must be accompanied by a statement from the attending physician or psychologist for review by the appropriate director.

Readmission in such instances requires clearance by the appropriate Bucknell University health director and approval of the academic dean.

Suspension: Suspension is a sanction that makes a student ineligible to continue enrollment and/or re-enroll at the University for a specific period of time. The Hearing Board or Administrative Hearing Officer making the decision to suspend will determine the date when the suspension shall take effect and the earliest date that the individual is eligible to re-enroll in the University and conditions, if any, that must be met before re-enrollment.

Should an individual be suspended within a semester, any refund of room, board, tuition, or fees will be made in accordance with applicable policy; no academic credit may be earned for that semester; and the student may not transfer in academic credit in a period of suspension from other institutions of higher education However, a student on suspension may carry course work elsewhere, not for transfer credit, but simply for personal edification or growth.

Suspension also applies to a student organization and requires that the group cease operation for a period of time. The Hearing Board or Administrative Hearing Officer making the decision to suspend will determine the date when the suspension shall take effect and the earliest date that the group is eligible to begin operation at the University and conditions, if any, that must be met before returning.

Leave of Absence: A student in good standing who wishes to temporarily interrupt studies may apply to the dean of the college for a leave-of-absence if the student intends to complete degree requirements at Bucknell University and if the courses for the semester preceding the leave have been satisfactorily completed.

The leave-of-absence will be for one semester. A student on leave will not be carried on Bucknell University rolls during the period of the leave. A student may be approved for only one leave-of-absence in any 12-month period. The 12-month period begins on the first day of the student's leave-of-absence.

Applications for leaves-of-absence normally will be submitted by August 1 for the fall semester, and by January 1 for the second semester. In no case will they be accepted after the student has completed the first day of class for a given semester. Students not wishing to continue their coursework after completing the first day of class will be processed as a voluntary withdrawal (see "Voluntary withdrawal from the University and readmission").

Leaves-of-absence will not be granted if the reason for separation is health,* academic, or disciplinary, or if, in the opinion of the dean of the college or the dean of students, the student may require advice and consultation before returning. During a leave-of-absence, students are not permitted to take academic coursework. Any exception to this regulation would require prior permission of the dean of the college and in no case would more than two course credits be approved.

Students on leave-of-absence who subsequently fail to return to Bucknell University will be administratively withdrawn with an effective date reverting back to the last date of attendance at the University. If a student decides to enroll at another institution and not return to Bucknell University, they must contact the dean of the college and initiate withdrawal from Bucknell University. In both cases a student will be required to submit an application to the dean of admissions to return to Bucknell University.

**A student who leaves for health reasons, as certified by the director of the student health services or the director of psychological services, must withdraw and must follow the procedures for readmission consideration noted above (see "Health withdrawal and readmission").*

A student who withdraws because of pregnancy or pregnancy-related disabilities will be reinstated for any semester or term requested to the status held prior to withdrawal.

CREDIT AND EVALUATION

Credit and transfer credit

Course credit: The unit of credit is a course credit. Normally a one-semester course is one course credit. However, some courses range from one-quarter course credit to three course credits. Four course credits constitute a normal load; three course credits constitute a minimal full-time load. For purpose of comparison, one course credit is considered equivalent to four semester hours or six quarter hours.

Advanced Placement and credit: Bucknell University recognizes advanced scholastic achievement in secondary schools by granting to qualified students University credit, advanced placement, a reduction of general education requirements, or a combination of these. Students receiving such recognition may enroll, as first-year students, in advanced courses in the subjects in which they have received the advanced placement, or they may elect courses in other subjects. This plan of advanced placement creates the opportunity to begin college work at a higher level, and it may shorten the time required to complete one's undergraduate work.

Course credits granted through the advanced placement program may be used to fulfill appropriate degree requirements. These normally include the disciplinary breadth requirements in the College of Arts and Sciences, minimum course credits required for graduation, and, if approved by the registrar and the department involved, specific major or minor requirements. (Physics credits may be considered as a laboratory science for the natural science divisional disciplinary breadth requirement only if approved by the department. Chemistry credits are not considered as a laboratory credit.)

A student's performance on the Advanced Placement Tests of the College Entrance Examination Board will determine whether advanced placement and credit will be granted. Most departments give credit for scores of 4 or 5. Credit is not given for scores of 1 or 2. In all instances, the credit will be given only for work equivalent to courses in the academic departments of the University. There is a limit to the amount of credit which may be granted in most subject areas. In addition, there is an eight-course maximum on the total credit which may be granted for advanced placement tests and for college work taken while in secondary school.

For more information pertaining to advanced placement and credit see Advanced Standing for First-year and Transfer Students on page 315.

International Baccalaureate and credit: IB Diploma recipients, with a minimum score of 5 on each of the six subject examinations, will be awarded six course credits toward their degree requirements at Bucknell University. Diploma recipients, not meeting the minimum score requirements, will receive course credit for only those higher level courses passed with a score of 5 or higher. IB Certificate students (non-diploma) will receive course credit for each higher level course passed with an examination score of 5 or higher. No credit is awarded for standard level courses except as noted for IB Diploma recipients above.

Credit by Examination: Full-time undergraduate students in residence may earn undergraduate credit by examination, with a letter grade assigned, in courses approved by a department and by the dean of the college concerned. Credit by examination is not available to graduate students, special students, students who have previously audited or failed the course, students on exchange from other universities, and persons who have never attended Bucknell University.

A list of courses available for credit by examination is available from the registrar. Application for such examinations must be made at specific times on a form available from the registrar. Approval must be obtained from the department chair and dean of the college concerned. If approval is given, the nonrefundable credit by examination fee is to be paid to the cashier for each examination, and the examination is to be taken at the appointed time.

A maximum of six course credits may be earned from credit by examination, credit granted for achievement on comparable subject tests of the College Level Examination Program, and nontraditional study courses. (Note that these six course credits are in addition to the eight-course maximum permitted under "Advanced Placement and Credit.")

Students in residence are expected to carry the minimum of three academic courses in each semester, not including possible credit by examination. Credit by examination grades of F are not recorded on the permanent record. The faculty is not expected to assist students in preparing for these special examinations.

Coursework elsewhere and transfer credits: Following admission, coursework elsewhere is permitted only during the summer when approved in advance by the registrar and during the academic year when approved in advance by the registrar and the director of international education; study elsewhere during the academic year is approved only for authorized programs abroad and a limited number of previously approved domestic programs. Credit for courses taken elsewhere, including courses taken previously by incoming first-year and transfer students, must be approved by the registrar.

The specific amount of credit which is posted to the student's Bucknell University academic record is based on the formula noted above (See "Course credits."). That is, one Bucknell University course credit is equivalent to four semester hours or six quarter hours. As a one-time exception to this formula, a student may receive a maximum of 2.0 Bucknell University course credits for six semester hours or 2.0 Bucknell University course credits for nine quarter hours; thereafter, the usual formula is applied.

Grading System

Grading: The performance of a student in each course is evaluated on the grade report by the use of the following symbols:

A:	Superior achievement
A–	
B+	
B:	High pass
B–	
C+	
C:	Pass
C–	
D:	Low Pass
P:	Passing work; no grade assigned
F:	Failing work
I:	Incomplete work; to be assigned only in accordance with the restrictions indicated below
AU:	Work as an auditor, for which no credit is given
IP:	Incomplete work in continuing courses for thesis, research, or honors project.

W: Approved withdrawal from a course during the extended drop period. Also may signify an authorized health withdrawal from a course at any time. (See paragraph below.)

WP: Approved withdrawal from a course after the prescribed time limits with a passing grade; usually approved only when the student is voluntarily withdrawing from the University. (See paragraph below.)

WF: Approved withdrawal from a course after the prescribed time limits with a grade below a D; usually approved only when the student is voluntarily withdrawing from the University. (See paragraph below.) Course credit is not given for a grade of F, AU, W, WP or WF.

All course withdrawals must be approved by the student's academic dean. In unusual circumstances, dropping a course may be approved through the fourth week of the semester if the student is still carrying three course credits; in two semesters, as exceptions to this four-week limit, dropping a course may be permitted through the 10th week of the semester. The grade of "W" is assigned for such approved course withdrawals. Exceptions to these deadlines may be approved only if there are serious health difficulties or similar extenuating circumstances. Poor performance, anticipation of poor performance, extracurricular obligations, changes in educational plans or interests, or the existence of extra course credits are not considered extenuating circumstances.

The grade of P, signifying passing work but with no grade assigned, is applicable only in courses specifically approved by the faculty.

The temporary grade of Incomplete will be authorized in the event of serious illness or personal emergency when requested by a student and approved by the course instructor and the dean of the student's college prior to the end of the examination period. Normally such a request will be in the form of a written petition, which will specify the date for its resolution, usually not later than three weeks after the end of the semester. The grade to which the incomplete will revert if the required work has not been completed by the specified date will be assigned by the instructor at the time the incomplete is authorized. Extension of the deadline must be approved by the dean of the student's college and will be granted only under exceptional circumstances, such as may occur in the case of missed laboratory work.

Grade Point Average: Four quality points are given for each full course graded A, 3.67 for each one graded A-, 3.33 for each one graded B+, 3 for each one graded B, 2.67 for each one graded B-, 2.33 for each one graded C+, 2 for each one graded C, 1.67 for each one graded C-, 1 for each one graded D, and zero for each course graded F or WF. A student's grade point average (GPA) is computed by dividing the number of quality points earned by the number of course credits attempted. The GPA calculation is carried to three places beyond the decimal point (i.e., thousandths) and is NOT rounded, but is truncated to two places beyond the decimal point (i.e., hundredths) to establish the official grade point average. Thus, for example, a student with a grade point average calculation of 2.799 has an official GPA of 2.79. Note that a grade of F or WF is included in the GPA.

Grade changes. Student-initiated requests for changes in a final course grade must be submitted by the first day of classes of the second academic year following the year in which the course was originally taken. For example, if a course was taken in spring 2005, the student's request for a grade change must come to the faculty member by the first day of the fall 2006 semester. Such a time period allows for individuals to appeal grades if they

have been away from campus for study abroad, leave-of-absence, or other separations from the University.

SUPERIOR ACADEMIC ACHIEVEMENT

The University recognizes superior academic achievement in a variety of ways. Among these are appointment to the dean's list, receipt of the President's Award for Distinguished Academic Achievement, the granting of degrees with distinction, graduation with honors, election to honorary and professional societies, and the awarding of prizes (for a complete listing, see page 381).

Dean's List

Undergraduates who successfully complete no less than 3.0 course credits during the semester and who earn a semester grade point average of 3.50 or higher receive dean's list honors for that semester.

President's Award for Distinguished Academic Achievement

Rising sophomores, juniors, and seniors, and graduating seniors with a cumulative grade point average of 3.90 or higher receive the President's Award for Distinguished Academic Achievement. In addition, there is provision for such recognition for rising seniors and graduating seniors who have met equivalent, specified criteria for a combination of years; details may be obtained from the registrar.

Degrees with Distinction ("Latin" honors)

Degrees with distinction are awarded to bachelor's degree candidates who have taken 30 percent or more of the number of courses required for graduation in courses numbered above 199. Additional requirements for graduation with distinction are as follows:

A degree *Summa Cum Laude* is awarded to a candidate who has achieved at the time of graduation a grade point average of 3.90, or better, and who has been in residence at Bucknell University for at least three years. (That is, having earned at least 24 Bucknell course credits.)

A degree *Magna Cum Laude* is awarded to a candidate who has achieved at the time of graduation a grade point average between 3.70 and 3.89 and who has been in residence at Bucknell University for at least three years. (That is, having earned at least 24 Bucknell course credits.)

A degree *Cum Laude* is awarded to a candidate who has achieved at the time of graduation a grade point average between 3.50 and 3.69.

Honors Program

All academic departments and interdisciplinary majors of the University offer the possibility of departmental honors, coordinated through the University Honors Council, in which students in those majors may undertake special studies or investigations.

The honors program also operates within the special programs known as the College Major and the Interdepartmental Major, as described on page 16.

Students interested in departmental honors should consult the heads of the departments and must apply for honors in accordance with the procedures established by the Honors Council.

Honorary, Recognition, and Professional Societies

Chapters of Phi Beta Kappa, the oldest national honorary scholarship society in America, and of Tau Beta Pi, the national engineering honorary scholarship society, are active on the campus. Phi Beta Kappa members are elected from the upper eighth of the junior class and upper fifth of the senior class.

There is a chapter of Alpha Lambda Delta, a national honorary scholastic society for first-year students. There is also a chapter of the National Society of Collegiate Scholars for first-year students and sophomores.

Omicron Delta Kappa and Mortar Board, national recognition societies for juniors and seniors, select their members for excellence in scholarship, leadership, and service. There is a chapter of Theta Alpha Phi, for recognition of excellence in dramatics.

There are also chapters of the following national honor societies:

Alpha Chi Sigma (chemistry)
Alpha Kappa Delta (sociology)
Chi Epsilon (civil engineering)
Delta Mu Delta (business administration)
Delta Phi Alpha (German)
Kappa Delta Pi (education)
Omicron Delta Epsilon (economics)
Phi Alpha Theta (history)
Phi Sigma (biology)
Phi Sigma Tau (philosophy)
Pi Delta Epsilon (journalism)
Pi Delta Phi (French)
Pi Mu Epsilon (mathematics)
Pi Sigma Alpha (political science)
Psi Chi (psychology)
Sigma Delta Pi (Spanish)
Sigma Pi Sigma (physics)
Tau Kappa Alpha (debating)

Professional societies having chapters on the Bucknell University campus are the American Institute of Chemical Engineers, the American Society of Civil Engineers, the Institute of Electrical and Electronics Engineers, the American Society of Mechanical Engineers, the Association for Computing Machinery, the American Chemical Society, the Society of Women Engineers, and the National Society of Black Engineers.

CONDUCT EXPECTATIONS AND REGULATIONS

Faculty members, administrators, and students of Bucknell University believe that the educational aims and purposes of Bucknell must be upheld and promoted by the personal integrity and responsibility of each individual member of the University. The University values a constituency composed of individuals with varied interests and diversity of

opinion, and also recognizes that its members must be bound together by respect for the individual and collective rights of other members of the academic community.

Rules and regulations to promote necessary order and unity stem from the corporate authority of Bucknell University. That corporate authority, in turn, stems from both public law and the Charter of Bucknell University, which was approved by the Commonwealth of Pennsylvania in 1846 and which remains under the charge of the University's Board of Trustees. Rules and regulations governing conduct, and procedures necessary for their implementation, express Bucknell's corporate authority for its members and are consistent with the *Joint Statement of Principles of Academic Freedom and Tenure* (1940), endorsed by the Association of American Colleges and the American Association of University Professors, and the *Joint Statement on Rights and Freedom of Students* (1967), endorsed by the Association of American Colleges, the American Association of University Professors, and the National Student Association.

In general, an individual's actions off campus are subject only to sanctions of civil authorities; however, whenever its interests as an academic community are clearly involved, the University may take disciplinary action independent of civil authorities. It should be understood that the University may have the responsibility of advising appropriate authorities of violations of civil or criminal law committed by anyone on its campus when a request is made by those authorities for specific information, or when there is a danger to life and/or property.

Acts which will subject a person to University disciplinary action are specified in the *Student Handbook*. Disciplinary procedures, rights, and censures as established for violations of University regulations are defined in the same publication.

Statement of Student Responsibility

> Bucknell's educational program stresses the preparation of its students for the exercise of high responsibility in all phases of society… Because our society presents continuing challenges to values, students are encouraged to cultivate respect for other individuals and cultures, enhancing in the course of this pursuit their own moral sensitivity, personal creativity, and emotional stability. At the same time, Bucknell's residential character provides a matrix within which institutional programs and practices that exemplify compassion, civility, and a sense of justice form an aspect of the educational experience.
>
> Mission Statement, page 1

Bucknell University is accordingly strongly committed to fostering a sense of social responsibility and nurturing an atmosphere of civility and integrity in all areas of student and community life. The following principles guide Bucknell's expectations of its students at all times:

- As responsible individuals, students are fully and personally accountable for their actions and the consequences of those actions, both on and off campus; inherent in this accountability is the obligation for knowing the policies, procedures, and rules that govern student conduct.
- As active participants in an educational community, students are expected to give the highest priority to academic opportunities and commitments; specifically, this expectation includes regular class attendance and participation, as well as the timely, responsible fulfillment of class assignments.

- As members of a social community, students are expected to respect individual differences and the rights of all others; the Bucknell University community does not tolerate harassment, discrimination, or violence against any person.
- As citizens, students are expected to show respect for the property and physical environment of one another, the University, and the local community.
- As persons with a duty to protect and promote the health and safety of others as well as themselves, students are expected to be free of substance abuse; alcohol and other drug use is never an excuse for unacceptable behavior.

Academic Responsibility

Bucknell University students are responsible for the preparation and presentation of work representing their own efforts. Acceptance of this responsibility is essential to the educational process and must be considered as an expression of mutual trust, the foundation upon which creative scholarship rests. Students are directed to use great care when preparing all written work and to acknowledge fully the source of all ideas and language other than their own.

In cases of alleged academic dishonesty, procedures involving the student, the instructor, the department chair, the appropriate dean, and a Board of Review on Academic Responsibility have been established to assess the facts and determine appropriate penalties, which range from a grade of F on the work to permanent dismissal from the University. Refer to the *Student Handbook* or *Faculty Adviser Handbook* for more detailed information.

Class Attendance

The academic goals and achievements of individual students are the University's primary purpose. The University also recognizes the significant contribution of other activities to the academic and personal development of Bucknell students. It is inevitable that conflicts will arise between the pursuit of extracurricular activities and students' academic schedules. With the emphasis on active learning in the College of Engineering and the Common Learning Agenda of the College of Arts and Sciences, class attendance has taken an even more vital role in the instructional goals of the University.

It is desirable, when conflicts do occur, that students have a policy available to guide their decisions concerning class attendance. The present policy states the expectations placed on faculty members, students, and extracurricular advisers, so that students may know their options and the ramifications of their choices.

Policy

I. Responsibilities about class attendance:
   A. Students are expected to attend the regularly scheduled meetings of the courses for which they are enrolled.
   B. Classes scheduled during class hours should be given priority over other activities. "No student who participates in an extracurricular event, team, or program can be penalized solely for missing such extracurricular activities when they are scheduled in conflict with regularly scheduled meeting times of the student's courses." (Action of the faculty, September 1993)
   C. Faculty should provide, on the first day of classes, a clear statement of:
      1. The consequences of any absences.
      2. Scheduled time commitments outside of class.

D. Students should not be required to attend extra or rescheduled academic events that conflict with other classes or other important commitments.

II. Responsibilities about non-class activities:
A. Extracurricular advisers should, during the first week of classes, inform students of those dates upon which they will be asked to miss a class due to an extracurricular activity.
B. Students should give faculty as much advanced warning of class absence as possible.
C. University units regularly sponsoring extracurricular activities are urged to develop guidelines about the appropriate level of demands to place upon student participants with respect to missing class.

III. General responsibilities:
A. Since students are ultimately responsible for their education at Bucknell University, they must be the ones to weigh the consequences of missing classes or other activities, and make their choices accordingly.
B. Both faculty and advisers of extracurricular activities are encouraged to be as flexible as possible in addressing attendance requirements.

Students and faculty may seek advice in these matters from their college dean.

Note: A listing of tuition and fees for the 2008-09 academic year is available from the Office of Finance, Bucknell University, Lewisburg, PA 17837.

FINANCES AND FINANCIAL AID

Required Deposits

Admissions. All incoming students are required to make a non-refundable deposit of $500 in accordance with the terms of the letter of admission to the University. This deposit will be credited to the student's first semester billing.

Other Deposits may be required of students enrolled in specific courses or programs.

Credit and Refund Policies

Tuition and room fees will be credited to students' accounts who give written notification of withdrawal from the University, subject to the conditions which follow. The date of receipt of the written notice by the Office of the Registrar will be considered the official date of withdrawal. No credit of tuition or room fees will be made after the midpoint of the term or semester. No refund will be made if academic credit is earned. Prior to the midpoint of the term or semester, tuition and room fees will be credited as follows:

Timing of Withdrawal	Amount of Tuition and Room Fees Credit
Prior to first day of classes	100 percent credit
From first day of classes through the mid-point of the term or semester	The amount of credit issued will reduced by two weeks of tuition and room fees for each week, or partial week, completed.
After the mid-point of the term or semester	No credit will be issued

The student fees will be credited, in full, in the case of voluntary withdrawal prior to the firrst day of classes. No portion of the fees will be credited after classes begin.

For students **suspended or dismissed for disciplinary reasons**, the University will not issue credit for tuition or room fees.

Active Duty Withdrawal: Students who must withdraw because they are called to active duty and who receive no academic credit for the semester will receive a full tuition refund. If academic credit is awarded, the refund will be prorated according to the amount of that academic credit. The student fees also will be credited in full, and room fees will be credited based on the number of unused days.

Board charges are credited on the basis of the unused portion of a board contract for all withdrawals, suspensions, and dismissals. Board charge credits are subject to a forfeit fee not to exceed $50.

For **off-campus or summer programs**, there will be no credit for the cost of personal services, travel expenses, supplies, or services furnished by outside contractors, which have been used prior to withdrawal or for which no credit is available to the University.

For **students other than full-time undergraduate students**, the "100 percent credit" period will extend through the end of the last day of the formal drop/add period.

Protection for Health-related Withdrawals: Bucknell University is pleased to offer a way to help families protect their substantial financial investment in a college education. The Tuition Refund Plan is an optional private insurance plan through A.W.G. Dewar, Inc., that assures subscribers who withdraw for illness or accident a refund throughout the semester, even if Bucknell's own refund policy has expired. For costs, benefit levels, further information, or an application form, please contact John Strain at Dewar, 4 Batterymarch Park, Suite 320, Quincy, MA 02169-7468, 617-774-1555.

Residence Hall Damage Charges
The University holds resident students responsible for any unassigned loss, damage, repair or replacement of the furnishings, door, windows, walls, and the condition of the room during the term of occupancy. Furthermore, since living in a University residence is a privilege accompanied by certain responsibilities associated with community living, resident students assume responsibility for unassigned loss or damage to any property in the public area (lounges, hallways, bathrooms, etc.) within the community. The charge for communal damage is posted on the hall as those damages occur. However, individual room damages and unassigned damage occurring in communal areas are posted on a resident's bill at the conclusion of each semester.

Refunds
Credit balances appearing on the student's billing account will be refunded in accordance with the following guidelines:

1. Refunds will be issued when a credit balance actually exists on the student's billing account.
2. If the total Title IV, HEA program funds credited to your account exceeds the amount of tuition, room and board, you may authorize Bucknell University in writing or electronically to pay other current charges that were incurred at Bucknell for

educationally related activities. These charges may include books, supplies, telephone toll charges, etc., which were incurred either before or within 14 days of the credit balance occurring.

3. If the credit balance is a result of excess payments, the credit balance will be refunded to the student or another individual upon the student's written request.
4. If a refund is not requested, the credit balance will remain on the account to help offset future charges.

Note: Specific credit and refund guidelines exist for students receiving financial assistance under Title IV of the Higher Education Act of 1965, as amended. This refund policy is printed in its entirety later in the University *Catalog*. Questions concerning these guidelines should be directed to the Office of Financial Aid by phone at 570-577-1331 or email finaid@bucknell.edu.

Financial Obligations

No student will be enrolled or graduated, and no student will be issued a transcript of record, until all accounts have been paid or satisfactory arrangements have been made with the Office of Finance.

Accounts are due upon receipt of the billing invoice. A late fee of 1 percent of the outstanding balance of any student account will be assessed each billing period until the account is settled.

A past due balance may result in the suspension of Bucknell University charging privileges. The charge privileges will not be reinstated until the account is paid in full. A penalty fee of $25 will be charged for any payment made by check, if the check is returned to the University. If any account is forwarded to our collection agency, the individual will also be responsible for paying any collection costs associated with the collection of this debt.

Bucknell University offers a Monthly Payment Plan, administered by Key Education Resources, as a convenient alternative to lump-sum semester payments. For additonal information about the plan, you may contact Key Eucation Resources at 1-800-KEY-Lend or visit their website.

Return of Federal Student Aid*

The federal government requires Bucknell University to publish the federal refund policy under Title IV of the Higher Education Act of 1965 as amended. This refund policy sets guidelines for students who withdraw from the University if they receive financial assistance from the federal government.

The Department of Education, under the Higher Education Amendments of 1998, Public Law 105-244 stipulates the way funds paid toward a student's education are to be handled when a recipient of the Federal Student Aid (FSA) funds withdraws from school. A statutory schedule is used to determine the amount of FSA funds a student has earned when he or she ceases attendance based on the period the student was in attendance. Up through the 60 percent point in each payment period or period of enrollment, a pro rata schedule is used to determine how much FSA funds the student has earned at the time of

withdrawal. After the 60 percent point in the payment period or period of enrollment, a student has earned 100 percent of the FSA funds.

In general, the Amendments require that if a recipient of FSA assistance withdraws from a school during a payment period or a period of enrollment in which the recipient began attendance, the school must calculate the amount of FSA assistance the student did not earn and those funds must be returned. The percentage earned is one of the following:

- If the day the student withdrew occurs on or before the student completed 60 percent of the payment period or period of enrollment for which the assistance was awarded, the percentage earned is equal to the percentage of the payment period or period of enrollment for which assistance was awarded that was completed.
- If the day the student withdrew occurs after the student has completed 60 percent of the payment period or period of enrollment, the percentage earned is 100 percent.

The percentage and amount not earned is the complement of the percentage of FSA assistance earned multiplied by the total amount of FSA assistance that was disbursed (and that could have been disbursed) to the student, or on the student's behalf, for the payment period or period of enrollment, as of the date the student withdrew, or the date of the institution's determination that the student withdrew.

If the student receives less FSA assistance than the amount earned, the school must comply with the procedures for post-withdrawal disbursement specified by the department in regulations. If the student receives more FSA assistance than the amount earned, the school, or the student, or both, must return the unearned funds as required, and in the order specified. The school must return the lesser of:

- The amount of FSA funds that the student does not earn; or
- The amount of institutional costs that the student incurred for the payment period or period of enrollment multiplied by the percentage of funds that was not earned.

The student (or parent, if a Federal PLUS loan) must return or repay, as appropriate, the remaining unearned FSA grant and loan funds. However, a student is not required to return 50 percent of the grant assistance received by the student that would be the responsibility of the student to repay.

The student (or parent, if a Federal PLUS loan) must return the unearned funds for which they are responsible to loan programs in accordance with the terms of the loan, and to grant programs as an overpayment. Grant overpayments are subject to repayment arrangements satisfactory to the school, or overpayment collection procedures prescribed by the Secretary of the Department of Education.

FSA Program funds for the payment period or period of enrollment for which a return of funds is required must be returned in the following order:

- Unsubsidized Federal/Direct Stafford Loans
- Subsidized Federal/Direct Stafford Loans
- Federal Perkins Loans
- Federal/Direct Grad PLUS Loans
- Federal/Direct PLUS Loans
- Federal Pell Grants for which a return of funds is required

- Academic Competitiveness Grants for which a return of funds is required
- National SMART Grants for which a return of funds is required
- Federal Supplemental Educational Opportunity Grants for which a return of funds is required
- Other assistance under Title IV regulations for which a return of funds is required.

The student will be issued the larger of the institutional refund or the federal refund. Any questions should be directed to Accounts Receivable at 570-577-3733.

*Source: 2007-08 Federal Student Aid Handbook

Financial Aid

Approximately 50 percent of Bucknell's undergraduate students receive need-based scholarships directly from the University. When other types of aid are considered – such as grants from sources other than the University, student loans, and campus employment – about 65 percent of our undergraduate students receive some financial assistance in meeting their educational expenses.

Bucknell's scholarship program is a mix of need-based, above-need and no-need awards. This blended approach provides the University with the flexibility to appropriately recognize the achievements of the best and the brightest students within our applicant pool. The majority of scholarships are awarded to students with financial need, and these are re-evaluated annually by considering family income, assets, number of members in the household, and number of children enrolled at least half-time in undergraduate degree-seeking programs. A limited number of scholarships will be awarded to students with no need or who do not apply for aid. Since we have an exceptionally talented pool of students applying for admission, all merit awards are extremely competitive.

First-year aid recipients will continue to receive financial assistance in subsequent years as long as they continue to demonstrate need as determined by the Office of Financial Aid, maintain satisfactory academic and social standing with the University, and meet the specified financial aid application deadlines. If a family's financial situation remains essentially the same, a student's aid will likely remain consistent over his or her four years at Bucknell University. However, changes in income, assets, and number of children in the family who are enrolled at least half-time in undergraduate degree-seeking programs can increase or decrease aid eligibility from year to year, so students will need to reapply for aid each year.

Financial aid usually is awarded in a combination of three forms:

Scholarships/Grants are gifts and do not have to be repaid. Funds for need-based scholarships/grants come from the University itself, as well as foundations, corporations, state agencies, and the federal government.

Student Loans are funds borrowed for educational expenses and must be repaid by the student, usually with interest.

Campus Employment provides an opportunity for students to earn funds for their educational expenses. Although students are not assigned specific jobs or placements by the Office of Financial Aid, financial aid recipients are often given preference in campus hiring. Financing for campus employment comes from the University and the federal government.

Students who qualify for the Federal Work Study program have additional opportunities for employment in the area of community service.

In order to be considered for financial assistance for a given academic year, prospective first-year regular decision students must complete the College Scholarship Service (CSS) PROFILE (www.collegeboard.com) no later that January 1 of their senior year of high school. (Early Decision I applicant deadline is November 15. Early Decision II applicant deadline is January 1.) Accepted and enrolling students must also file the Free Application for Federal Student Aid (FAFSA) with the federal processor by May 1, and submit tax, verification and any other requested documents to the Office of Financial Aid by May 10. Transfer student applicants must file the same paperwork as first-year applicants, but the transfer CSS deadline is October 1 for spring enrollment and March 15 for fall. Please refer to our literature for specific application information and procedures.

All inquiries and questions regarding financial aid at Bucknell University should be directed to the Office of Financial Aid.

ADMISSIONS INFORMATION

Qualifications for Admission

The requirements for matriculation of undergraduates as specified below apply to students admitted for the regular academic year, for summer school, or as special students.

Bucknell University is interested in selecting for admission those students who can best take advantage of the educational opportunities offered at the University.

In considering candidates for admission to the University, the members of the Admissions Committee and staff undertake a thorough evaluation of: the quality of the written application which the student submits; the secondary school curriculum of the applicant, with emphasis on both content and performance; aptitude for college study as reflected by the Scholastic Assessment Test (SAT-I) of the College Board or the American College Test (ACT) of the American College Testing Program; the written recommendation from the secondary school counselor or principal on behalf of the applicant; school and community activities and indications of special talents; and evidence of strong personal qualities of character, leadership, and personality. Applicants are required to have either a high school diploma or a GED or the equivalent. Obviously, those with the best academic preparation in secondary school and a demonstrated interest in being actively engaged in the myriad aspects of Bucknell's residential learning community are more favorably viewed by the Admissions Committee.

Filing an Application

Secondary school students may request a common application from the dean of admissions or by accessing our website at www.bucknell.edu. An application must be filed in the first half of the student's senior year in secondary school before January 1. A fee of $60, which will not be refunded, should be paid when the application is submitted.

Any applicant for admission as a student, or for the award of financial aid, who knowingly submits false or fraudulent information, conceals material information, or intentionally misleads or misinforms the University, may be denied admission; be subject to revocation

of an award of financial aid; if already admitted, be subject to discipline under the University's student conduct regulations, including dismissal from the University; or if a degree already has been awarded, have the degree rescinded if based on material fraud. Each applicant is required to certify that the information furnished to the University is accurate and complete.

Early Decision

Bucknell University offers two early decision plans which allow a student to apply early and to receive an answer by mid-December for Early Decision I, or late January for Early Decision II. Both plans are first-choice plans, which means that the student must have determined Bucknell University to be his or her first choice of colleges. Applications may be filed with other colleges, but must be withdrawn if admission is offered by Bucknell University.

Briefly, the program for early decision observes the deadlines and requirements listed below:

- Applications requesting early decision, including all required information, must be filed before November 15 for Early Decision I, and January 1 for Early Decision II, and should include at least junior year SAT or ACT scores and current high school transcripts.
- A statement must be submitted, signed by student, parents, and counselor, testifying that Bucknell University is the first choice of college.
- Notification of early decision admission will be made to the candidate by December 15 for Early Decision I, and by February 1 for Early Decision II, at which time a $500 non-refundable enrollment deposit will be required within 30 days of notification.
- One of three possible decisions will be rendered in the early decision plan: acceptance, deferral for later consideration, or denial.

Interviews

Interviews are not required. Therefore, students should not feel as though they need to have an interview in order to apply to Bucknell University. There are interviews offered on campus by admissions student interns and admissions staff members and also offered off campus by admissions staff members. In addition to interviews, Bucknell Preview Sessions are offered which include an admissions presentation and a campus tour.

Academic Requirements

Below are described the minimum requirements for various course areas as they relate to prospective major and non-major studies. As noted in an earlier section, the emphsis of the Admissions Committee review of a student's secondary school curriculum will be on both content and performance.

Requirements in Mathematics

The completion of at least two and one-half years of college-preparatory mathematics is required by the University for admission to any of its courses in mathematics. Students planning to take calculus at Bucknell University – including all students majoring in mathematics, science, engineering, economics, or management – are required to have additional preparation, including a year of precalculus. The term *college-preparatory mathematics* denotes a logical sequence of topics, including algebra and geometry, with emphasis on basic concepts and on principles of deductive reasoning. The term *precalculus*

denotes the study of polynomial, rational, trigonometric, logarithmic and exponential functions.

Requirements in Foreign Language

All applicants are required to have completed a minimum of two years of foreign language (in the same language) in secondary school for all of Bucknell's degree programs, but we advise more for bachelor of arts candidates.

Requirements in the Sciences for Engineering Students

Engineering students are required to have one unit of either chemistry or physics. It is strongly recommended that they shall have had a minimum of three years of science, including both chemistry and physics.

Standardized Tests

Each applicant is required to take either the Scholastic Assessment Test, (SAT-I) administered by the College Board of Princeton, N.J., or the American College Test (ACT) of the American College Testing Program. Each applicant is required to complete either of these tests in the junior year or in the fall of the senior year.

**It is recommended that applicants in the College of Arts and Sciences who are planning to continue the study of a foreign language take the SAT-II Subject Test in the language they intend to continue. Results will be used for placement purposes.*

**Foreign language tests are not a part of the selection process and may be taken any time prior to matriculation. However, placement is facilitated if they are taken by April of the senior year.*

Test of English as a Foreign Language (TOEFL). Students for whom English is not the first language are expected to submit the results of the Test of English as a Foreign Language (TOEFL) to show English proficiency. The minimum TOEFL score required by Bucknell University is 550 on a paper examination, 213 on a computer-based examination, or 79-80 on the Internet-based TOEFL (IBT).

Entrance Deferral

A student may elect to defer enrollment for one year after being admitted by submitting a request in writing to the dean of admissions. A non-refundable deposit will be required to hold this space for the year.

Advanced Standing for First-year and Transfer Students

An applicant who earns eight or fewer Bucknell University course credits at another college while simultaneously enrolled in high school normally shall be considered for admission only as a first-year student. Thus, it is assumed that such students will be eligible for, and required to comply with, University curricular and cocurricular programs and policies intended for those entering college immediately after high school.

Accordingly, first-year students will be limited to a maximum of eight transfer credits (including both AP and college courses elected while in high school) Such students may attend eight semesters (10 if enrolled in a five-year engineering program). Students who have earned more than eight course credits but still wish to be admitted as first-year

students should consult with the associate dean of their college to decide which eight courses they should select for transfer.

A student who wishes to transfer more than eight Bucknell University course credits including Advanced Placement and credits earned at another college while simultaneously enrolled in high school normally shall be considered for admission only as a transfer student. Thus, it is assumed that such students will not be eligible for, nor required to comply with, University curricular and cocurricular programs and policies intended for those entering college immediately after finishing high school. Such students will have their graduation date adjusted to reflect prior semesters' work. Graduation date (class year) determines the number of semesters a student may attend Bucknell University; when necessary due to curricular needs, the deans may adjust the student's graduation date.

A student who earns college credits while matriculated in a degree program elsewhere, and subsequent to high school graduation, will be considered for admission only as a transfer student. Should the number of accepted transfer credits be fewer than four, the students will be eligible for, and required to comply with, University curricular and cocurricular programs intended for first-year students.

While the foregoing policies are to apply in most situations, exceptions may be made in the admissions office following consideration of the particular circumstances of the applicant, and after appropriate consultation with the offices of the registrar, the academic deans, and Student Services.

A grade point average of 2.50 or better (on a 4.00 = A scale) is required of students who apply for transfer. (The mean GPA of accepted transfer students is a 3.4.) All courses comparable to those given at Bucknell University, which can be counted toward the requirements for graduation, and in which a grade of C or better was earned, will be credited. (A grade of C- or below will not be accepted for transfer credit.) Credit is not granted for Pass/Fail grades or audits. Examples of courses not acceptable for transfer are those in professional or vocational fields, courses from professional schools, mathematics at a level lower than our introductory calculus courses, and language courses which repeat high school work. Most students transfer to Bucknell University from schools which employ the semester hour credit system. For transfer purposes, Bucknell University courses are considered to be 4-semester-hours courses. In determining the number of Bucknell course credits, students from schools on a semester hour system may earn 2.0 Bucknell course credits for a maximum of two 3-semester hour courses. All additional credits will be evaluated on a formula whereby 4-semester hours are equivalent to 1.0 Bucknell course credit. Students from schools on a quarter hour system may earn 2.0 Bucknell course credits for coursework totaling nine quarter hours. All additional accepted course credits will be evaluated on a formula whereby six quarter hours are equivalent to 1.0 Bucknell course credit. The grade point average required for good standing and for graduation is compiled only on work taken at Bucknell University. An applicant for admission with advanced standing must submit to the dean of admissions an official transcript of record of all earlier college work and any other information the director may request.

In certain highly structured areas – such as the programs leading to the bachelor of music degree, the bachelor of science degrees, and the engineering degrees – the sequence of courses is very important. Potential transfer candidates interested in these areas should contact the Office of Admissions and appropriate department chair as early as possible for advice on course selection at the institution where the student is currently enrolled.

All applications and credentials must be received by March 15 from transfer candidates who wish to begin their studies at Bucknell University in the first (fall) semester, or by October 1 for the second (spring) semester. Transfer application materials and instructions will include a statement regarding policies and procedures for awarding of credit.

Students will not be admitted to the University as candidates for a bachelor's degree if they have earned more than 80 semester hours elsewhere. This maximum credit limitation includes credits earned through Advanced Placement Tests and subject College Level Examination Program tests of the College Board. To satisfy Bucknell's graduation requirements, undergraduates in the College of Arts and Sciences must complete a minimum of 12 Bucknell University courses, and in the College of Engineering a minimum of 13. In addition, a minimum of two semesters in residence during the junior and senior years is required. Both the first semester after matriculation and the final semester before graduation must be in residence.

Students who are accepted and plan to enroll at Bucknell University as a transfer student may be required to come to the campus for a counseling meeting prior to the start of their first Bucknell semester.

Medical Requirements

All full-time entering students must submit the medical history and physical examination form completed by their physicians. Students are required also to have completed the following immunizations: tetanus-diphtheria, polio, measles, mumps, rubella, and the first of three hepatitis B injections. The remaining two hepatitis B injections must be completed within one year.

In addition to the above, evidence of freedom from tuberculosis in the form of a mantoux test within one (1) year is required.

Meningitis: Pennsylvania law requires that every student who resides in University housing must become informed about meningitis as well as the possible risks and benefits of the meningitis vaccine. Every student then is mandated to provide to the Student Health Service official proof of having received the vaccine (which the University strongly recommends) or a signed statement that you understand the nature of the disease, the risks and benefits of the vaccine, but that you have chosen not to receive the vaccination.

Chicken-pox (Varicella) is recommended but not required.

Health Insurance Requirement

Bucknell University requires that all full-time undergraduate students, three or more credits, whether on campus or in a University-approved off-campus program, have their own medical insurance. This can be accomplished by providing evidence of your own coverage acceptable to Bucknell University, or by purchasing the University-sponsored program. Students will receive information regarding the University-sponsored plan, as well as a form for verification of their own insurance during the summer. In order to complete registration for fall semester the waiver/enrollment insurance card must be returned to the University by the date stated in the mailing.

The single exception is that all international students and Bucknell University-sponsored international dependents must purchase the University-approved health insurance plan, regardless of any other coverage they may have.

Readmission
A written request for readmission should be sent to the dean of admissions before June 1 for the fall semester, or before November 1 for the spring semester. Students should contact the Office of Admissions for information regarding fees for readmission and enrollment. A student who has been dropped by the University for academic reasons must wait until one year has passed before applying for readmission and then must provide convincing evidence of being able to complete degree work satisfactorily. A student who has withdrawn voluntarily and has attended another college or University without the permission of the dean of his or her college must submit an application for readmission under the regulations governing transfer students.

Special Students
An undergraduate special student is one who is not enrolled as a candidate for a degree. A student will be permitted to register as a special student only after being admitted to the University by the dean of admissions. The statement of admission will state the reason for this classification and any academic qualifications to be met. Admission will be for one year or less.

Crime Information
The Jeanne Clery Disclosure of Campus Security Policy and Campus Crime Statistics Act, Public Law #101-542, requires all colleges and universities in the United States to provide literature to prospective students, upon request, which relates crime statistics and the nature of the protection afforded students and their property at that college. This law also requires each institution to provide every person who submits an application, and to all enrolled students and employees, information regarding the institution's security policies and procedures. Bucknell University is in full compliance with this law and such information is available to you in writing, upon written request, or on the Bucknell University Public Safety website at www.bucknell.edu/PublicSafety/

PHYSICAL FACILITIES

Academic Buildings
The **Art Building**, erected in 1890, provides classrooms and studios for art students. The art curriculum is supported by more than 10,000 square foot of classrooms and workshops, most of which are located in the **Art Barn**, a converted dairy barn on the west campus.

The Ellen Clarke Bertrand Library (built in 1951 and named for a generous benefactress) is the center of information services for the campus. Located in one of the landmark buildings at Bucknell University, the library is a leader among peer institutions in providing access to both an outstanding traditional print collection as well as the increasingly important world of digital information. The Information Commons on the first floor of the library provides students with one location to get assistance with everything from how to find resources to write a paper to how to troubleshoot a computer or network problem. The library offers a variety of study spaces, network connections, databases, media services, and computer workstations. A Teaching and Learning Resource Center has been established in the library to support faculty development.

The **Botany Building** was renovated in 1992 for use by the Career Development Center and the Office of Human Resources.

The **Breakiron Engineering Building** opened for classes in the summer of 2004. The building, which expanded the facilities available to the College of Engineering by 45 percent, is connected at each floor to Dana Engineering to provide continuity between the two buildings in support of the interdisciplinary curriculum. The structure provides state-of-the-art laboratories and classrooms, as well as needed office space. The building is named for Lauren '52 and Margit Breakiron, whose lead gift made the project possible.

Bucknell Hall, dedicated in 1886, was renovated in 1988 for use as a poetry center and recital hall. It houses the Stadler Center for Poetry, named for benefactors Jack Stadler '40 and his late wife, Ralynn.

The **Carnegie Building** holds offices and classrooms for the department of history. Constructed in 1905 under a grant from Andrew Carnegie, this building originally served as the library of the University.

Named for Robert Rooke '13 in 1991, the **Rooke Chemistry Building** contains classroom and seminar rooms, faculty offices, and modern laboratories for faculty and students. In addition, designated laboratories house special equipment, such as nuclear magnetic resonance spectrometers, a gas chromatograph-mass spectrometer, and an x-ray diffractometer.

Linked to the Rooke Chemistry Building is the **Biology Building**, completed in the fall of 1991. The facility houses faculty offices and research laboratories as well as a variety of laboratories designed for use by both non-majors and majors and a rooftop greenhouse. Students enrolled in the biochemistry and cell biology majors share laboratories in the adjoining buildings. New animal study laboratories were constructed in the building in 2002.

William H. Coleman Hall, dedicated in 1959, was a gift of the F. W. Olin Foundation, and is named in honor of the late Dr. Coleman, who served Bucknell University for more than 30 years as professor of English, dean of the University, and vice president. Renovated in 2002, the building houses classrooms, faculty offices, several lecture halls, a number of laboratories and seminar rooms, and a 500-seat theatre equipped for work in the dramatic arts. Renovated in 1996, the theatre was renamed the Harvey M. Powers Theatre in 1997.

The **Charles A. Dana Engineering Building** is named for a generous benefactor in recognition of his support of engineering and scientific education. Begun in 1921 and completed in 1940, it houses the College of Engineering and provides the many laboratories and classrooms essential to the University's engineering program. An addition in 2001, called the Collaborative Learning Space, incorporates the latest teaching/classroom design.

Attached to the Dana Engineering Building is the **Computer Center,** (built in 1980) which serves as the network and telecommunications hub for the campus. Every student living on campus has easy access to a high-speed connection to the campus network and the Internet. Laptops may connect to the wireless network that is available across much of the campus, creating an environment of "any time, any place access." While student ownership of computers is not required, most students find having one to be a valuable part of the Bucknell experience. A variety of electronic classrooms and labs, the Information Commons in the library, a strong set of network services, and access to the network from student housing provides the Bucknell student with almost ubiquitous access.

The **Civil Engineering Structural Test Laboratory,** east of Dana Engineering, houses a 600,000-lb. Baldwin universal testing machine as well as civil engineering offices and other testing equipment.

Elizabeth Koons Freas Hall was given to Bucknell University in 1965 by the late A. Guy Freas, a trustee of the University, in honor of his wife. Connecting Coleman Hall with Marts Hall, it houses the admissions offices. The prominent patio atop the building on the academic quad was renovated in 2002.

The **Elaine Langone Center**, which opened in 1971, contains the University bookstore; student post office; study, game, and lounge rooms; offices for student life and student government; facilities for lectures, performances, and meetings; art gallery; and dining facilities, including a snack bar and the Refectory, a served dining room. The Roy Grier Bostwick Memorial Dining Room, serving students, is named in recognition of a gift to the University in his honor from the estate of his widow, Marie Leiser Bostwick. In 1990, Bucknell trustee Ken Langone '57 provided the naming gift for the student center in honor of his wife, Elaine. The Bostwick Dining Room and Servery were completely renovated in 2002. A major renovation to the snack bar was completed in 2006.

The **Observatory**, constructed in 1963 to replace an earlier one which had been a gift of William Bucknell, includes laboratories and an outdoor deck for astronomical research.

The **O'Leary Psychology and Geology Center** opened for the fall semester 2002. The 40,000 square feet facility brings together the psychology department staff in one location and provides new office, classroom and lab space for both geology and psychology departments. This building completes the phased development of the science center project. It is named in honor of Brian '60 and Judith McAllister O'Leary '60.

Funds for the construction in 1955 of the **F. W. Olin Science Building** came from the F. W. Olin Foundation. Renovated in 1989-90, it houses the departments of physics, mathematics, and education.

The **Psychology and Animal Behavior Laboratory** consists of offices, seminar rooms, computer rooms, and areas for the housing of animals, including quarantine cages and two all-weather enclosures in which two species of nonhuman primates live. The main building was built in 1947 and rebuilt in 1964 to serve its current function. In 1990, a major renovation of the facility was completed.

The Charles M. and Olive S. Rooke Chapel seats 500 on the main floor and 250 in the balconies. In addition to the chaplain's offices, the south wing houses a reception room and a meditation chapel. The chapel was given to the University in 1964 by Robert L. Rooke, Class of 1913, secretary emeritus of the Board of Trustees, in memory of his parents. Rooke Chapel was renovated during the summer of 2005.

Stephen W. Taylor Hall, named in honor of the author of the University's charter, was erected in 1849 as the first building on College Hill. In 1994, Taylor Hall was renovated for use by the management department, the Office of International and Off-campus Studies, and Bucknell Press offices.

The **Tustin Building,** which was used for many years as a gymnasium, is named in honor of Francis W. Tustin, Class of 1856, who later became a member of the faculty. Dedicated in 1890, the building was completely remodeled and equipped in 1938, and in 1961 a wing was added. Tustin is now used for academic and extracurricular programs. In 1986 the flexible black box Tustin Studio Theatre was opened.

The **Charles P. Vaughan Literature Building** and **Arnaud C. Marts Hall** correspond in design and size to Coleman Hall. A 450-seat auditorium, named for Leanne Freas Trout in 2003, classrooms, and offices for faculty are provided in the Literature Building, completed in 1938 and named in honor of Charles P. Vaughan, a trustee who also served, in 1931, as acting president.

Marts Hall, built in 1960, houses administrative offices as well as departments of instruction. Arnaud C. Marts, for whom it is named, was the University's seventh president and a member of the Board of Trustees.

Completed in 1988, the **Sigmund and Claire Weis Center for the Performing Arts**, a concert hall with seating for 1,300, is located west of the academic quadrangle at the entrance to the campus, opposite Rooke Chapel.

The **Sigfried Weis Music Building**, located next to the Weis Center for the Performing Arts, was completed in fall 2000 and houses classrooms, faculty offices, a computerized keyboard lab, practice rooms, a music library, and a 176-seat recital hall. It is named for Sigfried Weis, former chairman of the Bucknell Board of Trustees.

Athletic and Recreational Facilities

The Recreational Sports Complex includes the **Gerhard Fieldhouse**, completed in 1978, which provides facilities for intramural and recreational activities and sports, as well as indoor practice space for intercollegiate teams. It includes a 350-foot by 180-foot main playing floor which includes a six-lane, 220-yard track oval that was resurfaced in 2007. There are five tennis courts, six volleyball courts, and seven basketball courts laid out on the floor. This playing area also can be used as a surface for any of the field sports and may be subdivided by nets to permit a number of concurrent activities. An L-shaped building wrapped around the playing floor includes a dance studio, a wrestling room, eight handball/racquetball courts, three squash courts, and a climbing wall.

The Fieldhouse is connected to **Davis Gymnasium,** named in honor of the late Warren Davis, Class of 1896, a member of the Board of Trustees. The main part of the gymnasium, completed in 1938, was the gift of 20 trustees.

The University added substantially to facilities available for recreation and athletics with the dedication of the **Kenneth Langone Athletics and Recreation Center** in 2003. Opened in the fall of 2002 are the Kinney Natatorium, housing an Olympic-size pool, and the Krebs Fitness Center, a 14,000-square-feet fitness center. The Sojka Pavilion is a 4,000-seat multi-purpose gymnasium opened at the beginning of the second semester of the 2002-03 academic year. Renovations to existing facilities include a new training center in the Davis Annex and varsity locker rooms in the Fieldhouse, as well as new coaching offices in Davis Gym.

The **Christy Mathewson-Memorial Stadium** seats about 13,000 people and includes an eight-lane, all-weather track and grass-like artificial playing field for football and lacrosse.

A gift of alumni and friends of the University, it was dedicated in 1924 to the memory of Bucknell men and women who served their country in times of war. After its renovation in 1989, it was renamed to honor Christy Mathewson, a member of the Class of 1902. At the main entrance to the stadium is the **Christy Mathewson Memorial Gateway**, erected in 1928 and presented to the University by organized baseball in memory of the Hall of Fame pitcher.

Other athletic facilities include a jogging course, an 18-hole golf course, 10 lighted tennis courts, two lighted platform tennis courts, an artificial surface field hockey and lacrosse field, lighted field hockey field, sand-based natural turf lighted soccer field, and additional playing fields. In 2006, a grandstand facility was constructed to support the field hockey and soccer fields.

Residence Halls

Occupying a prominent place on College Hill is a complex of three large residence halls: **Rush H. Kress Hall, Main College,** and **Harland A. Trax Hall**. The central section of Main College has been designated as **Daniel C. Roberts Hall,** in memory of the man who provided funds for its rebuilding in 1937. Nearby **Kress Hall** is named in honor of Rush H. Kress, Class of 1900, for 36 years a trustee of the University and a generous contributor to his alma mater. **Trax Hall,** built in 1907, is named for a trustee and benefactor, Harland A. Trax. Most rooms in these facilities, which together accommodate over 350 students, are singles.

Gateway Residence Center. Completed in 1986, these five buildings – Roser Hall, Malesardi Hall, Kalman-Posner Hall, Vidinghoff Hall, and Silbermann Hall – accommodate a total of 250 upperclass students. Each floor contains four suites accommodating four students each. Each suite includes four private bedrooms, a living room, a kitchen, and full bathroom facilities. Common laundry facilities are available within the center. On-grade suites are available for handicapped students.

Larison Hall, renovated in 1995, is a large residential building connected on the west with **Bucknell Cottage** and on the south with **John Howard Harris Hall**. Together they accommodate 275 residents. Nearby **Hunt Hall,** built in 1928, which houses some 150 students, is named in honor of former President Emory W. Hunt, and provides private residence rooms and common facilities for Bucknell's sororities. The building was completely renovated in the spring semester 2003.

McDonnell Hall, with 300 beds, opened in fall 2000. Two four-story wings are connected by corridors to a two-story center unit containing lounge areas and seminar rooms. Each floor houses two "neighborhoods" with one single and nine double rooms surrounding a common lounge. McDonnell Hall is named in honor of Elizabeth and James McDonnell III and their daughter, Katherine '94.

Smith Hall. Completed in 1986, this residential unit houses approximately 220 students in a three-story building that contains a wide array of common facilities including seminar and study rooms, computer facilities, TV lounges, and common kitchen and laundry facilities. The building is named in honor of Robert '39 and Margaret Farrell Smith '41.

James S. Swartz Hall, near the Academic Quadrangle, is named for a long-time member and chairman of the Board of Trustees, and generous benefactor. Built in 1954, it houses 360 residents.

Vedder Hall, completed in 1965, is named in honor of Lee N. and Grace Q. Vedder, in recognition of the transfer to the University of the assets of the foundation which they endowed. It is home to over 350 residents, most of whom live in double rooms.

Bucknell West, a complex of residential units on the western edge of the campus, provides accommodations for 272 upperclass students. Each H-shaped unit has two wings, each of which contains two bedrooms, a bath, and a combination living room-kitchen. The complex is accessible via a pedestrian underpass, completed in 1991.

Other Facilties

The **Walter C. Geiger Physical Plant Building,** constructed in 1938 between Tustin and the Power Plant, was named for Walter C. Geiger '34, who served as superintendent of buildings from 1946-57 and physical plant director from 1957-78. It houses the facilities offices, garages for utility service vehicles, several trade shops, and a small storage area.

The **Forrest D. Brown Conference Center,** about seven miles from the campus, is used primarily for conferences and informal gatherings. It was named in 1966 in honor of the man who served for 30 years as secretary and adviser for the University's Christian Association. The center provides overnight accommodations for 60 people. Facilities include a kitchen, an outdoor covered picnic pavilion, and 40 acres of open areas for outdoor recreation. A 'Challenge Course,' consisting of low and high rope elements as well as a climbing and rappelling tower, was added in the fall of 2004.

The University also owns a 60-acre **Nature Site** bordering Chillisquaque Creek a few miles from the campus. The property is used in laboratory work under the environmental science program, but also is open to all members of the University community for research or visiting.

One of the historic buildings on University Avenue, the **Robert Lowry House**, immediately opposite the President's House, was renovated to provide offices for Psychological Services. The home was built in 1856 by The Reverend Joseph P. Tustin, then secretary of the Board of Trustees. Robert Lowry wrote some of his most famous hymns during his residence in the house from 1869-75. The home was later acquired by William C. Bartol, a distinguished member of the faculty from 1881-1928, from whose heirs the University purchased the property in 1984.

The **Seventh Street Café**, built in 1948 as a student recreation center with a snack bar called the Bison, later served as a psychology lab, a biology lab and a piano lab until 1993, when it was renovated and renamed. The building, which includes exterior and interior student lounge areas and a coffee bar, also contains the Craft Center.

Bucknell Co-Generation Power Plant provides most of the electricity and all of the steam needed by the campus, as well as chilled water to support much of the campus's air-conditioning needs, in a fuel-efficient and environmentally responsible manner. In addition, Bucknell supports the development of renewable energy through the purchase of wind-produced electricity and student-operated solar photo-voltaic arrays that provide electricity to the Bucknell University Environmental Center building and one Bucknell West residential unit.

Facilities for Students with Disabilities

Accessibility for students with disabilities is provided in almost all academic facilities and programs. The Elaine Langone Center, the Ellen Clarke Bertrand Library, etc., are fully accessible. Fully accessible residence hall facilities also are available.

ENDOWMENTS AND MEMORIALS

Endowed and Named Chairs and Faculty Fellowships

The David Burpee Chair in Plant Genetics was established in 1983 through the generosity of David Burpee, Bucknell University trustee for more than 40 years. Incumbents of the chair will be selected to advance knowledge in plant genetics research.

The John P. Crozer Chair of English Literature was established in 1865 and honors a faculty member known for outstanding scholarship in English literature. John P. Crozer, a trustee of the University, gave Bucknell University, in 1856, a substantial gift for the purpose of more fully founding and endowing the University.

The William H. Dunkak Chair in Finance in the Department of Business Management was established by William H. Dunkak Jr., in memory of William H. Dunkak. The chairholder will be included in the faculty of the College of Arts and Sciences, and will be charged with teaching about, and conducting, guiding and supporting personal and student research in the area of finance.

The William C. and Gertrude B. Emmitt Memorial Chair in Biomedical Engineeering was established to honor the memory of these members of Bucknell's Class of 1930 by their children, Virginia M. Chitwood, Class of 1959, Richard B. Emmitt, Class of 1967, and William C. Emmitt Jr., Class of 1969. The chairholder will be included in the faculty of the College of Engineering, and will be charged with teaching about and conducting, guiding, and supporting personal and student scholarship activity in the area of biomedical engineering.

The Jane W. Griffith Faculty Fellowship was established by Jane W. Griffith, Class of 1943, in 2005. Fellowship grants from this fund are awarded to superior newly hired faculty to support their research and professional academic development.

The John Howard Harris Chair in Philosophy honors a faculty member known for superior teaching and outstanding scholarship. The chair was established in 1925 in honor of the fourth president of Bucknell University. President Harris, who worked to build a faculty of superior teachers who maintain a high level of scholarship, was responsible for the expansion of the Bucknell curriculum to include professional and technical studies.

The Samuel H. Kress Professorship of Art History was created in 1967 by the Bucknell University Board of Trustees as a memorial to one of the leading patrons of the arts in the United States. It was funded through the sale of real estate given by the Samuel H. Kress Foundation after the death of Rush H. Kress, Class of 1900, a generous benefactor and Bucknell trustee for many years. Holders of the chair will be selected to recognize excellence in teaching and scholarship in the field of art history.

The Christian R. Lindback Chair in Business Administration was created by a gift from the Christian R. and Mary F. Lindback Foundation in 1960, in memory of Christian R. Lindback and in recognition of his sustained interest in faculty development in all disciplines of the University.

The John D. MacArthur Chair was established in 1981 with endowment funds from the John D. and Catherine T. MacArthur Foundation, to assist in bringing new and promising faculty members to Bucknell University. The professorship rotates from department to department every five years at the designation of the president.

The T. Jefferson Miers Chair in Electrical Engineering was established by gifts from Louise Matthews Miers, Class of 1926, to honor the memory of her husband, T. Jefferson Miers '26, by promoting outstanding faculty scholarship at Bucknell University. Holders of the chair will be selected to recognize the excellence of their scholarship, teaching ability, and their leadership in the field of electrical engineering.

The National Endowment for the Humanities Chair in the Humanities was established in 1989 with funds from the National Endowment for the Humanities and honors an associate professor with a strong record of scholarship and teaching in the humanities at Bucknell University.

The Robert L. Rooke Chair in the Historical and Social Context of Engineering was established by a bequest from the estate of Robert L. Rooke '13. The chairholder will be included in the faculty of the College of Engineering, and will be charged with teaching about and conducting, guiding, and supporting personal and student research on the historical and social effects of technology and engineering. This teaching responsibility will be cross-disciplinary, and may include courses and students in both the College of Engineering and the College of Arts and Sciences.

The Rooke Professorship in Engineering was established in 2004 with funding from the estate of Robert L. Rooke '13. The chairholder will be a tenured member of the College of Engineering faculty, and will be charged with initiating or enhancing activities identified to be of special benefit to the educational programs and students in the College of Engineering.

The Howard I. Scott Professorship in Management was established in 1988 by funding from the Howard I. Scott Endowment, created by Howard I. Scott '39 from gifts during his lifetime and his residuary bequest in honor of his parents, Russell Lewis Scott and Bessie Harrison Scott, to underwrite teaching, scholarly research, and lectures concerned with leadership, innovation, and strategic management in the modern business world.

The Ruth Everett Sierzega Chair in Linguistics was established by Edward Raymond Sierzega to recognize excellent teaching and scholarship in linguistics and languages. The chair was established by Mr. Sierzega to preserve and honor the memory of his wife, Ruth, Class of 1945.

The Herbert L. Spencer Professorship in Biology was established in 1970 as a memorial to Bucknell's eighth president (1945-49) and executive director of the Samuel H. Kress Foundation, with a grant from the Kress Foundation.

The Swanson Fellowships in the Sciences and Engineering were established by their children to honor Mary Jane and John P. Swanson, members of Bucknell's Classes of 1952 and 1951. Swanson Fellowships are granted to superior newly hired faculty in the laboratory science and engineering departments to support their research and professional academic development.

The Charles P. Vaughan Chair in Economics was created by the Bucknell University Board of Trustees in the mid-1920s in recognition of Charles P. Vaughan's sustained support of the University during times of extreme financial duress. The chair honors Charles P. Vaughan by promoting a faculty of superior teachers who maintain a high level of scholarship.

Endowed Scholarships

Note: The majority of Bucknell's endowed scholarships are awarded to qualified individuals on the basis of documented financial need, as determined by the Office of Financial Aid. A small number of scholarships are awarded regardless of financial need. Awards from all the funds shall be made in compliance with the University policy of nondiscrimination.

The Accenture Scholarship was established in 1996 by Accenture, a global leader in management and technology consulting. The award was created in recognition of the numbers of Bucknell University graduates enjoying successful careers at Accenture, and to demonstrate Accenture's ongoing support of the Bucknell student community. Preference for the scholarship shall be given to upperclass students (sophomores, juniors, or seniors) who have maintained a solid GPA while demonstrating active participation and leadership in campus activities.

The William D. Adams Presidential Scholarship was established in 2000 by Judy Plattman Denenberg, Class of 1957, and Byron A. Denenberg, Class of 1956, in honor of William "Bro" Adams, who served as Bucknell's 14th president from March 1995 to June 2000. The scholarship shall be awarded to students with demonstrated financial need, with preference for students whose ethnic, racial, economic, or national origins add to the diversity of Bucknell University.

The Guy A. Agati Memorial Scholarship was established by Norma Z. Agati to honor the memory of her husband. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The George I. Alden Trust Scholarship was established through a distribution from the George I. Alden Trust. The scholarship shall be awarded to students with demonstrated financial need and give preference to students who reside in Massachusetts or other New England states.

The Dr. Alexander Aleshouckas Allen, Class of 1922, and Joseph Aleshouckas Allen, Class of 1915, Scholarship for students of chemistry and chemical engineering was established by Patricia Allen Dreyfus, "Doc's" daughter and Joe's niece. Preference for the scholarship award shall be given to residents of Luzerne, Schuylkill or Berks counties, Pa.

The Ezra Allen Scholarship was established by Ezra Allen, Class of 1895, to be awarded to a student who meets high academic standards, a preference to be shown for a student majoring in biology.

The Vivian B. Allen Foundation Scholarship Fund was created in 1969 to provide scholarship aid for students from foreign countries.

The American Baptist Men of Pennsylvania and Delaware Scholarship was established to assist needy and deserving students, with preference given to American Baptists.

The David James Ambuhl '80 Memorial Scholarship was established by his family and friends. The scholarship shall be awarded to students with the most pressing financial need, with preference for students enrolled in the College of Arts and Sciences and without other restriction.

The Ted Ammon Scholarship was established by R. Theodore Ammon, Class of 1971. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Robert S. Anderson Scholarship was established by Dr. Anderson, Class of 1933, to support premedical students from northeastern Pennsylvania. Residents of Luzerne County will receive first consideration, followed by residents of Lackawanna and Wyoming counties.

The Mike Andrews '64 Scholarship was established in 2000 by friends and classmates of Mike Andrews, Class of 1964. The scholarship shall be awarded to students with demonstrated financial need, with preference for students enrolled in biomedical engineering courses.

The Arvilla J. Arnold Scholarship was established by Arvilla J. Arnold. The scholarship shall be awarded to students with demonstrated financial need with preference for students who are on the varsity track or cross country teams and without other restriction.

The Association for the Arts Scholarship was established by the association in 1988. The scholarship is awarded at the discretion of the executive committee of the association to provide financial assistance to deserving undergraduate students with preference given to students who display special talents in one or more of the arts, such as, but not limited to art, creative writing, dance, music, and theatre.

The Athletic Scholarship was established anonymously by a member of the Class of 1980. Preference for awards from this scholarship shall be given to talented scholar-athletes with demonstrated financial need.

The Voris Auten Scholarship Fund was established by a bequest from Joseph W. Deppen, Class of 1900. The income is to be used for scholarships for those who have resided in Mount Carmel for 10 years, who are graduates of Mount Carmel Public High School, who are not habitual users of tobacco, intoxicating liquor, and narcotics, and who do not participate in strenuous athletic contests.

The Warren Baas Scholarship, established by the family and friends of Warren Baas, Class of 1973, is to be awarded to a member of the senior class, with preference given to an engineering major, who has combined academic strength and significant extracurricular contributions to the University.

The Baird Family Scholarship was established by Charles F. and Norma W. Baird, Class of 1946. Preference for the scholarship award shall be given to worthy and needy students, and without any restrictions.

The George Ballentine Scholarship was established by The Reverend George Ballentine, A.M., Class of 1871, for a preministerial student.

The Herbert Barness Scholarship was established by gifts from family and friends in honor of Herbert Barness, Class of 1948. The income is to be used annually to provide financial aid to a deserving undergraduate selected by the University.

The Kirk Richard Barrett Memorial Scholarship was established March 8, 1997, by the family and friends of Kirk Barrett, Class of 1987, in his memory after a tragic and untimely death in 1994. It includes a gift from his estate in honor of his love for Bucknell, and his respect for Professors Warren Abrahamson and Michael Moohr. The income is to be awarded annually to a junior or senior student with financial need, with preference given to a major in biology, economics, or business, who has been supportive of the best interests of Bucknell University and who has demonstrated positive interpersonal skills and leadership.

The Charles S. Baton Scholarship was established in memory of Charles S. Baton (Charlie), Class of 1983, by his family: his parents, Janet M. and G. Scott Baton; his sister, Elizabeth B. Lydon; his wife, Cheryl A. Reagan, Class of 1985; and his daughter, Emily Lauren Baton Reagan. It is to be awarded to worthy and needy students, without restriction.

The Louis M. and Elsie Battenfeld Scholarship was established in 1975 by Louis M. Battenfeld, the income to be used to provide financial aid for worthy undergraduate or graduate students selected by the University.

The Matthew C. Baumeister Memorial Scholarship was established in 2006 by Lynn and Michel Baumeister in memory of their son, Matthew Charles Baumeister, Class of 2008. Preference for the scholarship award shall be given to students who have overcome significant personal obstacles in order to attend Bucknell University.

The Bright W. Beck Scholarship was established by a bequest of Bright W. Beck, Class of 1913, the income of which is to be used to provide financial assistance to students.

The William H. Beck Scholarship was established by Aida M. Houston in memory of her uncle, Class of 1862, the income to be used for students of the Christian faith who are in need of financial assistance.

The Edward Bell Family Memorial Scholarship was established by Martin Bell Christy Jr., Class of 1931, and other descendants of Edward Bell. Bell family members were included among Bucknell's first trustees, students, and administrators; over 100 descendants have attended Bucknell University. This scholarship was established to commemorate those long family ties. Preference for the scholarship will be given to Pennsylvania residents.

John A. Bell Memorial Scholarship was established by Amy Bell, his wife, and by the gifts of friends to honor his memory. Preference for the scholarship award will be given to qualified and needy students majoring in mechanical engineering.

The Rowland E. Bell Family Scholarship was established by Rowland E. Bell, Class of 1959. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Paul Benson Memorial Scholarship was established by William Mendenhall III to honor the memory of his former teacher and colleague. Preference for the scholarship award will be given to students interested in applied mathematics who reside in Lycoming or other central Pennsylvania counties.

The Caroline V. S. Bergen Scholarship was established by her son, John L. Bergen, Class of 1935. The scholarship shall be awarded to students with demonstrated financial need, with preference for students who intend to pursue careers in medicine or who have demonstrated a significant commitment to be of service to others.

The Berlin Family Scholarship was established by George R. Berlin, Class of 1965, his mother, Elizabeth Smith Berlin, Class of 1935, and his sons, Bradley J. Berlin, Class of 1993, and William B. Berlin, Class of 1993 (M.A.), in recognition of George R. Berlin's father, William H. Berlin, Class of 1935. Preference for the scholarship award shall be given to students whose racial, ethnic, cultural, economic or other characteristics enhance the diversity of Bucknell's student group.

The Ellen Clarke Bertrand Scholarships were established by a bequest from Ellen Clarke Bertrand, a former trustee, in memory of her husband, Herbert Bertrand, and her parents, Samuel J. and Agnes Robertson Clarke, the income of which will be used as scholarships for young women and men of ability and good character who need financial assistance.

The Beshel Family Scholarship was established by Joseph J. Beshel. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Beth Eden Baptist Church Scholarship was established by the Beth Eden Baptist Church of Pittsburgh for a preministerial student needing help.

The Howard D. Bidwell Scholarship was established in 2000 by Howard D. Bidwell, Class of 1952. The scholarship shall be awarded to students with demonstrated financial need, with first preference for students majoring in the civil engineering program and secondary preference for students majoring in other engineering programs.

The Harriet Smull Blesh Fund was established by Harriet Smull Blesh, Class of 1928, and her husband, Morrell H. Blesh, in honor of their son, James Smull Blesh. Income from this fund shall be used each year to provide scholarship aid, modification of physical facilities, special aid and assistance, or whatever is deemed most necessary by the University to make education possible for qualified students with physical handicaps.

The Lawrence S. Bloom Scholarship was established by Mr. Bloom, Class of 1952, to support qualified students with demonstrated financial need. First preference for the award will be given to student residents of Blair County, Pa.

The Elmer K. Bolton Scholarship was established by a gift from Elmer K. Bolton, Class of 1908.

The Boston-Lyon Family Scholarship was established in 1999 by Lois Depuy Boston, Class of 1945, and her husband, E. Daniel Boston. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Roy Grier Bostwick Scholarship Fund was established by action of the Board of Trustees out of the residuary bequests in the estate of Marie Leiser Bostwick, Class of 1899. It honors her husband, Class of 1905, a member, 1919-47, and chairman of the Board of Trustees, 1941-47.

The Bott-Jennings Family Scholarship was established by Robert L. Jennings Jr., Class of 1973, and Barbara H. Bott, Class of 1973. The scholarship shall be awarded to students with demonstrated financial need, whose ethnic, racial, economic or national origins add to the diversity of Bucknell University.

The Richard W. Bowen – Class of 1944 Scholarship was established by Richard W. Bowen, Class of 1944. Preference for the scholarship award shall be given to students enrolled in the College of Engineering, and holding superior academic credentials.

The James Roland Brady Scholarship was established by James E. Soller, Class of 1969, and Janet Clark Soller, Class of 1968, in memory of James' maternal grandfather. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Arthur L. Brandon Athletic Scholarship was created by a bequest from Arthur L. Brandon, Class of 1927. Awards made from the scholarship shall be granted to talented student-athletes with demonstrated financial need, especially those who have been selected by the coaches, in consultation with the director of athletics and the director of financial aid, as most likely, without a grant from this fund, to attend some other college. Awards from the fund shall be made without other restriction.

The Arthur L. and Margaret Weddell Brandon Scholarship was established by trustee emeritus Arthur L. Brandon, M.S. 1927, in loving memory of his wife, Margaret, Class of 1916. The scholarship is given preferentially as a grant to reduce the self-help obligation of student-athletes at Bucknell University.

The Brandon Family Scholarship was established by Virginia Brandon Davis, Class of 1936, in honor of the Brandon family members who attended Bucknell University. The scholarship is given preferentially as a grant to reduce the self-help obligation of student-athletes at Bucknell, and serves as a companion to the Arthur L. and Margaret Weddell Brandon Scholarship.

The Lauren P. Breakiron Scholarship was established by Lauren Breakiron, Class of 1952. Preference for the scholarship award will be given to students who are citizens of the United States majoring in engineering or computer science.

The Brough-Webber Memorial Scholarship was established in 2004 by Elizabeth Brough Webber and William R. Webber, Class of 1950. The scholarship shall be awarded to students with demonstrated financial need, with preference for students majoring in music, business, or economics.

The Wayne Marshall Brown Memorial Scholarship was established by Harriet C. Brown, J. Marshall Brown, and friends in memory of Wayne Marshall Brown, Class of 1973. Preference for the scholarship award shall be given to a qualified student majoring in art.

The P. Dewees Browning Scholarship was established by a bequest of Daisy Bell Browning in memory of her husband, Class of 1904, the income to be used as a scholarship for a deserving student.

The Bucknell Alumni Association Scholarship was established in 1985 by the board of directors of the Alumni Association of Bucknell University. Preference for awards from the fund will be given to students who meet the requirements for financial aid and who are the children of Bucknell alumni.

The Harriet M. Bucknell Scholarship, to be awarded to a young woman, was established by Mrs. Harry S. Hopper in memory of her mother.

The William Bucknell Scholarships are given to help worthy young men to obtain an education with which to increase their usefulness in life.

The Bernita Earl Budenbender Scholarship was established by Brenda M. Earl, Class of 1981. Preference for the scholarship award shall be given to students who are judged to have the most pressing financial need enrolled in the College of Arts and Sciences, and without other restriction.

The Marie and Fred A. Bufanio Sr. Scholarship was established by Fred A. Bufanio Sr., Class of 1936, and his wife, Marie. The scholarship shall be awarded to students with demonstrated financial need, with preference for students majoring in chemical engineering and without other restriction.

The Clyde E. Burgee Memorial Scholarship Fund was established by Samuel H. Woolley, Class of 1932, and other former students and friends of Professor Burgee, the income to be used to aid needy students majoring in accounting and economics.

The Joseph Hamilton Burnett Scholarship was established by a bequest of Helen Couffer Bonsall, the income to be used as a scholarship for deserving students.

The John C. Bush Memorial Scholarship was established by Ellen Q. Bush, Class of 1979, in memory of her father, John C. Bush, Class of 1942. Preference for the scholarship award shall be given to students from northeast Pennsylvania, and to those students whose enrollment supports the University's vision for diversity.

The William J. Busser Jr. and Alvesta R. Busser Memorial Fund was established by a bequest of William J. Busser Jr., the income to be used for scholarships for needy and worthy graduates of the Lewisburg Area High School who are nominated by the Lewisburg Area School Board and who could not otherwise afford a college education.

The Edna Follmer Butt Memorial Scholarship was established by an estate gift from Grace R. Follmer, Class of 1921, and Helen Follmer Lutz, Class of 1921, in memory of their sister, Edna Follmer Butt, Class of 1922, who was a teacher of mathematics. Preference for the scholarship award shall be given to students majoring in mathematics.

The Robb '86 and Joan D. '86 Cadigan Family Scholarship was established in 2004 by Robb '86 and Joan D. '86 Cadigan. The scholarship shall be awarded to students with demonstrated financial need, who are majoring in the liberal arts.

The Joseph J. Calaman and John T. Calaman Scholarship was established by Joseph J. Calaman, Class of 1943, and is named for him and his brother, John T. Calaman, Class of 1950. The scholarship shall be awarded to students with demonstrated financial need, with preference for students who are United States citizens majoring in the arts, business, sciences, or engineering.

The John V. Campana III Scholarship was established in his memory by IDS Financial Services Inc. and enhanced by family and friends. The income will provide financial aid for a deserving undergraduate athlete selected by the University in accordance with established scholarship policies. Preference shall be given to a junior or a senior athlete who is majoring in management, accounting, or economics, and who is interested in the financial services profession.

The Douglas K. Candland Scholarship was established by Glen E. Tullman, Class of 1981, and his wife, Trish, to honor Professor Candland's years of service as teacher, scholar and mentor. The scholarship shall be awarded to students with demonstrated financial need who are majoring in the liberal arts.

The Thomas G. Carodiskey Scholarship was established by Thomas G. Carodiskey, Class of 1949, in memory of Dr. Roy C. Tasker, professor of biology, and Dr. Mildred A. Martin, professor of English. The scholarship shall be awarded to students with demonstrated financial need, with preference for students of the arts and humanities and without other restriction.

The F.W. "Bill" Carson '42 and Betty Thomas Carson '42 Scholarship was established in 2000 by Bill Carson '42 and Betty Carson '42. The scholarship shall be awarded to students with demonstrated financial need, with preference for students majoring in English who have demonstrated interest in creative writing.

The Harry L. and Marjorie R. Carson Scholarship was established in 2000 by Harry L. Carson, Class of 1939, to celebrate his long association with Bucknell University and to honor the memory of his wife, Marjorie. Awards are to be made to students with financial need, with preference given to students majoring in management or accounting.

The Dora O'Brien and Margaret O'Brien Case Scholarship Fund was established by the estate of James A. Case, Class of 1917. Awards from the fund are to provide scholarships to needy women graduates of Lewisburg area high schools attending Bucknell University.

The James B. Cawley Scholarship was established by Florence T. Cawley in memory of her husband, Class of 1887, for the support of a worthy student from Northumberland County.

The William A. Cawley Memorial Scholarship was established by Alice Spokes Cawley, Class of 1929, in memory of her husband, a member of the Class of 1915. The scholarship award will be made without restriction.

The John I. Chamberlain Scholarship was established by a bequest from the estate of his mother, Elizabeth I. Chamberlain, to preserve and honor the memory of John I. Chamberlain, Class of 1966. The scholarship shall be awarded to students with demonstrated financial need, with preference for students who are members of the editorial staff of *The Bucknellian.*

The Thomas S. Christo Jr., Class of 1965, Memorial Scholarship was established by his parents, to be awarded preferably to a worthy member of the Alpha Phi chapter of the Kappa Sigma fraternity.

The G. Thomas Clark Scholarship was established by G. Thomas Clark, Class of 1959. The scholarship award shall be given to needy and deserving students with preference given to those from the Rochester, N.Y., metropolitan area.

The Class of 1907 Scholarship Fund was established by a contribution from Mary Stanton Speicher and John W. Speicher, her husband. Additional funds were provided by Margaret E. Catherman in memory of her husband, John I. Catherman. The income is to be given to a worthy and needy student.

The Class of 1929 Scholarship is awarded each year to a deserving student.

The Class of 1932 Scholarship was established at the 50th Reunion of the class through gifts by class members. There are no restrictions on the scholarship, which is to be awarded by the Office of Financial Aid in accordance with standard University policy.

The Class of 1934 Scholarship, established at the 50th Reunion of the class through gifts by class members, is awarded annually to a deserving student.

The Class of 1936 Scholarship was established by members of the class during their 50th Reunion year. The scholarship is unrestricted.

The Class of 1937 Scholarship was established by members of the class in 1987 to commemorate their 50th Reunion. The scholarship is unrestricted.

The Class of 1938 Scholarship was established by members of the class in 1988 to commemorate their 50th Reunion. The scholarship is unrestricted.

The Class of 1939 Scholarship was established by members of the class in 1989 to commemorate their 50th Reunion. The scholarship award will be made without restriction.

The Class of 1940 Scholarship was established in 1990 by members of the class and presented to the University in memory of former Bucknell president Arnaud C. Marts, to commemorate their 50th Reunion. The scholarship award will be made without restriction.

The Class of 1941 Scholarship was established in 1991 by members of the class to commemorate their 50th Reunion. This scholarship was presented to the University in honor of all Bucknellians who served in World War II, especially those who gave their lives. The scholarship award shall be made without restriction.

The Class of 1942 Scholarship was established in 1992 by members of the class to commemorate their 50th Reunion. The scholarship award shall be made to a deserving undergraduate student and without other restriction.

The Class of 1943 Scholarship was established in 1993 by members of the class to commemorate their 50th Reunion. The scholarship award shall be made to deserving undergraduate students with demonstrated financial need, and without other restriction.

The Class of 1944 Scholarship was established in 1994 by members of the class to commemorate their 50th Reunion. The scholarship award shall be made to deserving undergraduate students with demonstrated financial need, and without other restriction.

The Class of 1945 Scholarship was established in 1995 by members of the class to commemorate their 50th Reunion. The scholarship award shall be made to deserving undergraduate students with demonstrated financial need, and without other restriction.

The Class of 1946 Scholarship was established by members of the class during their 40th Reunion year. The scholarship is unrestricted.

Class of 1957 Scholarship was established in 2007 by members of the class of 1957 to commemorate their 50th Reunion. The scholarship shall be awarded to students with demonstrated financial need, and without restriction.

The Class of 1968 Scholarship was established by the class at its 10th Reunion as part of Bucknell's first Senior Class Reunion Gift Program. It is to be awarded each year to a deserving student.

The Class of 1970 Scholarship was established by members of the Class of 1970 in celebration of their 25th Reunion and in honor of Gary A. Sojka on the occasion of his retirement as 13th president of Bucknell University. The scholarship commemorates Dr. Sojka's many contributions during his tenure at Bucknell University. Consistent with his commitment to the founding principles and cherished traditions of the University, and his all-inclusive interest in and dedication to all Bucknell students, awards from this fund shall be made to students with demonstrated financial need and without restriction.

The Class of 1985 Scholarship was established in 1995 by members of the class to commemorate their 10th Reunion. The scholarship award shall be made to deserving undergraduate students with demonstrated financial need, and without other restriction.

The Class of 1986 Scholarship was established in 1996 by members of the class to commemorate their 10th Reunion. The scholarship award shall be made to deserving undergraduate students with demonstrated financial need and without other restriction.

The R. Henry Coleman Memorial Scholarship was established by friends and family members of Mr. Coleman, a Bucknell trustee from 1955-76, and chairman of the board from 1972-76. The Coleman Scholarship will be awarded annually to Bucknell students with demonstrated need and high academic promise.

The Colvin-Greene Memorial Scholarship was established in memory of Irene Colvin Kunschner, Class of 1927, and in honor of her parents, Eva Greene and Abram Colvin, by their family, friends, and neighbors. Preference for the award will be given to students of musical accompaniment and the humanities, with special preference to residents of Susquehanna County, Pa.

The Clarence B. and Samuel G. Comstock Scholarship was established through a bequest by Rachel M. Comstock. The scholarship fund is for students in the junior class who have excelled in the study of biology, and who seem likely to become outstanding medical practitioners.

The Claire M. Conway Scholarship was established by Claire M. Conway, Class of 1905.

The John R. Conway Scholarship was established by Patricia M. Watts in memory of her brother-in-law. Preference for the scholarship award shall be given to students who intend to pursue a career in business.

The Conway Family Scholarship was established by Larry and Carolyn Wilcox (Class of 1962) Conway. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Cook Scholarship was established by Thomas N. Cook Jr., Class of 1978. Preference for the scholarship award will be given to students demonstrating excellence and leadership in academics, athletics, and fraternal activities.

The Eugene and Doris Cook Scholarship was established in 2002 by M. Eugene Cook, Class of 1943. The scholarship shall be awarded to students with demonstrated financial need studying engineering, computer science, physics, chemistry or premedical studies, and who reside in Union, Snyder, Centre, Clinton, Lycoming, Northumberland, Columbia or Montour counties, Pa.

The Franklin H. and Ann Graybill Cook Scholarship was established by gifts from Franklin H. and Ann Graybill Cook, both members of the Class of 1933. Preference for the scholarship award shall be given to students majoring in sociology or political science.

The William Albion Cook Scholarship was established by Mrs. Augusta N. Cook in memory of her son, Class of 1899, for a male student.

The Mr. and Mrs. Robert L. Cooley Scholarship was established by Robert L. Cooley, Class of 1936, and his wife, Norma. The scholarship shall be awarded to students with demonstrated financial need, who have excelled academically.

The John R. and Virginia R. Cooper Scholarship was established by a testamentary gift from Mr. Cooper, a friend to Bucknell University, and father and grandfather of Bucknellians. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Reverend Emily W. Craig Scholarship was established through a bequest from Emily W. Craig, Class of 1944. Preference for the scholarship award shall be given to a student studying religion or English.

The Ernest S. Cramer Scholarship was established by Ernest S. Cramer, Class of 1938. Preference for the scholarship award shall be given to students with demonstrated financial need majoring in engineering or the sciences.

The Anna May Speare Crist Scholarship was established by Charles W. Crist in memory of his wife, Class of 1923, the income to be used for an outstanding student majoring in French.

The CTW-Beneficial Foundation Scholarship Fund was established in 1973 by the Beneficial Foundation, Inc. In 1998 the foundation changed its name to CTW Foundation, Inc. The income is to be used to establish scholarships for needy and disadvantaged students.

The H. E. Culver Scholarship for Science and Engineering was established by H. E. "Ed" Culver, B.S. Class of 1950, M.S. Class of 1951. Preference for the scholarship award shall be given to students enrolled in the five-year program in liberal arts and engineering, who combine engineering with physics or chemistry, and to students majoring in physics or chemistry.

The Jane W. Curtis and Susan J. Curtis Scholarship was established by Jane Wherly Curtis, Class of 1957, and her daughter Susan J. Curtis, Class of 1989. The scholarship shall be awarded to students with demonstrated financial need, with preference for students majoring in French.

The Cusick Scholarship was established by William J. and Joyce D. Cusick, parents of William J. Cusick, Class of 1981, George R. Cusick, Class of 1983, Susan Sisto Cusick, Class of 1983, and Thomas E. Cusick, Class of 1987. The scholarship shall be awarded to University students with demonstrated financial need, with preference given first to descendants of William J. and Joyce D. Cusick, then to members of a men's varsity lacrosse team who are citizens of the United States.

The George H. and Kathleen DeRosa Damman Scholarship was established by George H. and Kathleen DeRosa Damman, both Class of 1956. Preference for awards from this scholarship shall be given to talented scholar-athletes who participate in varsity intercollegiate golf and who have demonstrated financial need.

The Richard Darlington Memorial Fund was established by a bequest of Richard Darlington, Class of 1909, who served as a member of the Board of Trustees for 11 years, the income to be used to aid worthy and needy students.

The K. H. "Happy" and Virginia Brandon Davis Scholarship was established by Virginia Brandon Davis, Class of 1936, in memory of her husband. The scholarship award shall be made without restriction.

The Nelson F. Davis Jr. Scholarship Fund was established by action of the Board of Trustees from residuary bequests in the estate of Harriet I. Johnson to honor a loyal member of the Class of 1922.

The Phoebe B. Davis Memorial Scholarship was established by Alice V. Davis, Class of 1925, to preserve the memory of her sister, Phoebe, a member of Bucknell's Class of 1922. Preference for the scholarship award will be given to young women, majoring in English, who plan a secondary school teaching career.

The Jeffrey, Julie Ann and Philip Dawson Scholarship was established by Chester S. and Julia Shank Dawson, Class of 1948, in loving memory of their children. Preference for the scholarship award will be given to students with an interest in art or music.

The Michael J. Delaney Scholarship was established by Michael J. Delaney, Class of 1952. The scholarship shall be awarded to students with demonstrated financial need, with preference for graduates of Greater Nanticoke Area High School (Nanticoke, Pa.) or for students who are residents of Luzerne County, Pa., and without other restriction

The Denenberg Family Scholarship was established by Judy Plattman Denenberg, Class of 1957, and Byron A. Denenberg, Class of 1956. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Brenda Earl and Michael De Paola Scholarship was established in 2000 by Brenda Earl, Class of 1981, and her husband, Michael De Paola. Preference for the scholarship award shall be given to students enrolled in the College of Arts and Sciences who are judged to have the most pressing financial need and without other restriction.

The Gertrude J. Deppen Scholarship Fund was established by Joseph H. Deppen, Class of 1900, in memory of his sister, Class of 1902, the income to be used as scholarships for those who have resided in Mount Carmel for 10 years, who are graduates of Mount Carmel Public High School, who are not habitual users of tobacco, intoxicating liquor, and narcotics, and who do not participate in strenuous athletic contests. Bucknell University will award scholarships to full-time graduate students under the terms and conditions of the Voris Auten Scholarship Fund and the Gertrude J. Deppen Scholarship Fund only if there are funds available from these endowments after awards have been made to undergraduate applicants. If funds are available, and graduate awards are to be authorized in any given year, public notice must be given in the Mount Carmel community newspaper and in appropriate ways at the Mount Carmel Public High School so that all college graduates who meet the requirements of these endowments and who wish to apply for such graduate scholarships would have an opportunity to do so.

The Dale A. and Carolyn M. Derr Scholarship was established by Dale A. Derr, Class of 1950, and his wife, Carolyn Melick Derr, Class of 1949. Preference shall be given to qualified students from Columbia County, Pa.

The Sara H. Derr Scholarship was established in her memory by Dr. Ralph B. Derr, Class of 1917, the income to be awarded to a deserving student.

The Woodward H. Diller Scholarship, established by Mr. and Mrs. William J. Diller, is to be awarded to a student who meets the academic standards of Bucknell University. Recipients shall be members of ROTC, who are enrolled at the University, regardless of financial need.

The Gail E. Dobert Memorial Scholarship was established by friends and family of Gail E. Dobert, Class of 1983, whose life was tragically lost in Dubrovnik, Croatia, while on a government mission with Department of Commerce Secretary Ron Brown. Gail was a loyal and respected public servant all of her professional life, and helped and touched many Bucknellians' lives. Gail is missed dearly and will be remembered for her uplifting spirit, energy and passion for life. Preference for the scholarship award will be given to a Long Island, N.Y., student interested in a public service career, with special preference given to students participating in a semester of study in Washington, D.C.

The Martin Drum Scholarship is available to junior college transfer students majoring in civil engineering.

The Jay Dugan Scholarship was established by the University in recognition of a gift of sculpture by Jay Dugan. The scholarship is unrestricted.

The John David Duncan Memorial Scholarship was established in 1970 by his family and friends.

The John P. Dunlop Scholarship was established by Bucknell alumni and friends of John P. Dunlop, former Dean of Students. Preference for the scholarship award shall be given to those students demonstrating outstanding leadership to the Bucknell community such as was encouraged by John P. Dunlop.

The Steven S. Dyer Scholarship was established by Mr. and Mrs. Alexander P. Dyer and their friends in memory of their son. The scholarship is to be awarded to the student who meets the academic standards of Bucknell University and possesses leadership potential as evidenced by a combination of willpower, motivation, and human relations skills.

The John D. Dzurinko Memorial Scholarship was established in 2005 by family and friends of John D. Dzurinko, Class of 1981. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The W. Warren Egee Memorial Scholarship was established by Mrs. Egee to honor the memory of her husband, Class of 1938. Preference for the scholarship award will be given to qualified and needy students enrolled in the College of Engineering, especially mechanical, electrical, or chemical engineering.

The David D. Ekedahl Scholarship was established by Retailer Financial Services, a unit of GE Capital, to honor David D. Ekedahl, a Bucknell trustee and member of the Bucknell Class of 1956, on the occasion of his retirement from GE Capital. Awards from this scholarship will be made without restriction.

The Ekedahl Family Scholarship was established by Dave Ekedahl, Class of 1956, and his wife, Patty Ekedahl. Preference for the scholarship award shall be given to students whose ethnic, racial, economic, or national origins add to the diversity of Bucknell University.

The Frederic S. and Carol Cobb Elliott Scholarship was established by Frederic S. Elliott, Class of 1961, and Carol Cobb Elliott, Class of 1963. Preference for the scholarship award shall be given to students with demonstrated financial need and without other restriction.

The Ira T. Ellis Jr. Scholarship for the College of Engineering was established by Ira T. Ellis Jr., Class of 1956, to benefit students with demonstrated financial need. Preference for the scholarship award shall be given to students enrolled in the College of Engineering, with special preference given to those students majoring in electrical engineering.

The Warren E. and Nora G. Elze Scholarship was established by Warren and Nora Elze, members of the Class of 1948. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Ernest Family Scholarship was established by Russell G. Ernest, Class of 1942, his wife, Matty Ernest, and their son, Richard C. Ernest, Class of 1970, his wife, Susan, and their daughter, Deborah, Class of 1999. The scholarship shall be awarded to students with demonstrated financial need who are majoring in engineering, the sciences or the management department curricula.

The Everett Scholarship for the College of Engineering was established by Russell W. Everett, Class of 1916, as a tribute to his parents, Mr. and Mrs. Alexander David Everett; his brothers, Harry S. Everett, Class of 1912, and Mark R. Everett, Class of 1920; and his daughter, Ruth Everett Sierzega, Class of 1945. The income from the fund is to be awarded to deserving students in the College of Engineering.

The Margaret D. Ackerman and Ruth Ackerman Fairbairn Scholarship was established by Margaret D. Ackerman, Class of 1925, in memory of her sister, Ruth Ackerman Fairbairn, Class of 1927. Preference for the scholarship award shall be given to students majoring in classics or minoring in Latin, Greek, or classical civilization.

The Samuel Farwell Scholarship, established by Samuel S. Farwell, is for preministerial students recommended by the department of religion.

The Bradley J. Fetchet September 11th Memorial Scholarship was established in 2003 by the Bradley J. Fetchet Memorial Foundation, the Fetchet Family and Brad's friends to honor the memory of Bradley J. Fetchet, Class of 1999, who perished in the attacks on the World Trade Center in New York City on September 11th, 2001. Brad was a dedicated young man with a special twinkle in his eye and an unending smile who often said, "You can tell the character of a man by what he does for the man who can offer him nothing." This scholarship shall be awarded to a student with financial need, with special preference given to student-athletes who best exemplify the qualities that made Brad so special – his spirit of enthusiasm, compassion, love of life, commitment to family, friends, community and especially those in need.

The Edwin and Florence Fetterman Scholarship was established by their daughter, Anna Fetterman Gutekunst, Class of 1944. The scholarship shall be awarded to students with demonstrated financial need, with preference for students who have demonstrated service to Bucknell and/or the surrounding community, and without other restriction.

The 1957 Fiji Scholarship was established by graduating members of the 1957 Phi Gamma Delta fraternity in gratitude for the role Bucknell University has played in their lives. The scholarship shall be awarded to a man or woman with demonstrated financial need, who shows academic promise, and whose activities and behavior reflect positively on the University. Special preference shall be given to members of Phi Gamma Delta fraternity.

The Martha A. Fisher Scholarship was established by an estate gift from Martha A. Fisher, M.A. 1943. Preference for the scholarship award shall be given to needy and deserving students, and without other restriction.

The Aldus Fogelsanger Scholarship was established by Sarah Slaughenhaup Madison, Class of 1941. Preference for the scholarship award will be given to students in the College of Engineering with demonstrated financial need.

The Joanne E. Lewis Forsyth and Family Scholarship was established in 1998 by Kenneth J. and Nancy J. Lewis, parents of Joanne E. Lewis Forsyth, Class of 1995. The scholarship shall be awarded to students with demonstrated financial need. Preference shall be given to talented student-athletes, with special consideration given to student-athletes from California or the West Coast, whose ethnic, racial, economic, or national origins add to the diversity of Bucknell. The scholarship award shall be made without other restriction.

The John Edward Fowler Memorial Scholarship was established in 1989 by the John Edward Fowler Memorial Foundation. Preference for the scholarship award will be given to academically qualified, needy students, matriculating from the Washington, D.C., metropolitan area.

The Charles Winslow Frampton Scholarship was created by a bequest from Elma C. Frampton, widow of Charles W. Frampton, Class of 1931. Charles Frampton was a lawyer and legal scholar, who held the position of Administrator of Orphans' Court in Philadelphia, Pa. Awards from the scholarship will be made to Bucknell University students with demonstrated financial need.

The A. Guy Freas Scholarship was established by Arthur K. Freas, Class of 1948, and Margery H. Freas, to honor the memory of A. Guy Freas. Awards from the scholarship shall be granted to students with demonstrated financial need.

The Freeman-McCaskie Scholarship was originally established as the McCaskie Scholarship by Evelyn H. McCaskie, Class of 1911, in appreciation of the educational opportunities Bucknell University offered her and her sisters, Carrie and Florence, both Class of 1906. In 1997 it was renamed to reflect the interest in and support of the scholarship by Kenneth W. Freeman, Class of 1972, and to honor his parents, James E. and Elizabeth McCaskie Freeman (cousin to the McCaskie sisters). The scholarship will provide assistance to worthy students, with preference given those who have demonstrated proficiency in music, French, or Spanish.

The Marcia R. Fremont Scholarship was established by gifts from the family and friends of Marcia R. Fremont, Class of 1950. It is to be awarded to a student majoring in science.

The Michael M. and Lillian A. Fremont General Scholarship was established in 1997 through a bequest from Michael M. Fremont, a friend of the University. The scholarship shall be awarded to full-time students with demonstrated financial need and without other restriction.

The Michael M. and Lillian Amber Fremont Scholarship was established through gifts from Michael M. Fremont and is intended to prepare students to promote international understanding and further cooperative relationships between the United States and other nations. Preference for the scholarship will be given to undergraduate students who are citizens and residents of countries other than the United States; interested students must make specific application for this award.

The Albert L. and Edward Friedman Memorial Scholarship Fund was established by a bequest from Edward Friedman, the income from which is to be awarded to a student requiring financial assistance.

The Elizabeth Stage Fulton Scholarship was established through a bequest from her daughter, Margaret Fulton Connors, to preserve the memory of Elizabeth Stage Fulton, a member of Bucknell University's Class of 1911. Elizabeth followed her sister, Anna Stage Hoffman, Class of 1908, to Bucknell from their home in Clearfield. Both returned home to central Pennsylvania to teach, raise families and share a love of literature, drama, and spiritual growth. The sisters were lifelong friends. The scholarship honors Elizabeth for her intellectual curiosity and devotion to family. The scholarship is to be awarded to needy and deserving students of Bucknell University without other restriction.

The Alan D. Gardner Memorial Scholarship was established by family and friends to commemorate the demonstrated loyalty of Major Gardner, Class of 1962, to his country, University, and fellow citizens, and is to be awarded to a student of proven academic excellence with a potential for strengthening campus extracurricular programs and for responsible community involvement following graduation.

The Warren D. and Esther S. Garman Scholarship was established by a bequest from the estate of Esther Selsam Garman. Awards from the scholarship are to support students in engineering with demonstrated financial need.

The Norman E. and Mary Lou Garrity Family Scholarship was established by Norman E. Garrity, Class of 1963, and Mary Lou Roppel Garrity, Class of 1964. The scholarship shall be awarded to students with demonstrated financial need, with preference given first to descendants of Norman E. and Mary Lou Garrity and then to graduates of Tamaqua High School (Tamaqua, Pa.) or Steel Valley High School (Munhall, Pa.).

The Sue Ann Geisler Scholarship was established by her parents, F. Ellis and Jane Sutherland Harley '59/'60, and other friends and family members, to honor the memory of Sue Ann, a member of Bucknell's Class of 1986. The scholarship shall be awarded to students with demonstrated financial need, with preference for students majoring in international relations.

The Gibb Foundation Scholarship was established by gifts from the Foundation beginning in 1986. The scholarship is to be awarded without restriction.

The Francis Gilbert Scholarship Fund was established in 1951 by Dr. Irving Berlin, Honorary 1940, in memory of his lifelong friend, the income to be awarded annually to worthy and needy students in the department of music.

The Leslie Kayfetz Gordon Memorial Scholarship was established by Judith Menapace Haverty and Elizabeth Smith Mao, both Class of 1971, to preserve the memory of their

fellow classmate who died of breast cancer at a premature age. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The H. Lynn and Dorothy Mae H. Goughnour Scholarship was established by H. Lynn Goughnour, Class of 1932. The scholarship award will be made without restriction.

The Sidney Grabowski Scholarship was established by the children and grandchildren of Sidney Grabowski, Class of 1915. Preference for the scholarship award shall be given to students residing in Lackawanna or Luzerne (Pennsylvania) counties.

The Matthew G. Gray and Ellen P. Gray Scholarship was established in 2000 by a bequest from Ellen Phebey Davis, Class of 1933. The scholarship shall be awarded to students with demonstrated financial need with preference for students from Luzerne County, Pa.

The Green Family Scholarship was established in 2000 by Bradford '59 and Rhoda Green. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Robert B. Greer II Memorial Scholarship was established by the family, friends, and classmates of Robert B. Greer II, Class of 1986, to honor his memory. The scholarship award shall be made without restriction.

The Roy and Ariel Griffith Memorial Scholarship was established by Jane W. Griffith, Class of 1943, in memory of her parents. The scholarship award shall be given to needy and deserving students with preference given to those enrolled in the pre-med program.

The Griffith Family Scholarship was established by Dr. Bartley P. Griffith, Class of 1970, and Denise C. Griffith, and Bartley P. Griffith Jr., Class of 1997. The scholarship shall be awarded to students with demonstrated financial need, with preference for students participating in intercollegiate athletics, particularly football and/or men's lacrosse.

The George G. Groff and Margaret M. Groff Scholarships were established by a bequest from the estate of Frances L. Groff, of the Institute Class of 1907, in memory of her parents. The income from one of the scholarships is to be used for a deserving man who plans a career in medicine.

The Margaret Beaver Groff Scholarship was established by a bequest from the estate of Frances L. Groff, of the Institute Class of 1907, in memory of her sister, Class of 1904, the income to be used for a deserving man who plans a career in medicine.

The Robert R. Gross Scholarship was established by James E. Nevels, Class of 1974, and his wife, Lourene Dellinger Nevels, Class of 1974, in honor of Robert Gross, professor of English. The scholarship award shall be made without restriction.

The Robert G. Guempel Family Scholarship was established by Robert G. Guempel, Class of 1948. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Art Gulden Scholarship was established by cross country and track and field alumni, family, and friends to honor Art Gulden on the occasion of his 25th anniversary as coach of Bucknell University's men's and women's cross country and track and field teams. Preference for the scholarship award shall be given to a member of the cross country or track and field teams.

The H. Dean Gulnac Scholarship was established by H. Dean Gulnac, Class of 1940. Preference for the scholarship award shall be given to students enrolled in the College of Engineering.

The Clarence Kent and Marilla Stouck Gummo Scholarship was established in their memory by their son, Blanchard Gummo, professor of art, with preference being given for students majoring in art. Descendants of Mr. and Mrs. James Ambrose Gummo and Ella Blanche Counsil Gummo, and of Mr. and Mrs. Murray Jesse Stouck and Ida Jennette Clark Stouck are to be given first consideration if they should be accepted by Bucknell University.

The Arthur A. Haberberger Jr. and Karen M. Spano Scholarship was established in 2005 by Joanne and Arthur Haberberger Sr. The scholarship shall be awarded to students with demonstrated financial need, with preference to students who are majoring in sociology or computer science.

The Linda Thompson Hager Scholarship was established by a bequest from Linda Thompson Hager, Class of 1959. Preference for the scholarship award shall be given to students with demonstrated financial need who are graduates of Hightstown High School, in Hightstown, N.J., or if none qualify, then to graduates of high schools in Mercer County, N.J.

The Velola E. Hall Scholarship was established by The Reverend Henry Chandler Hall, A.M., Class of 1882, in memory of his daughter, Class of 1904, for a college woman.

The Allen and Dorothy Hamburg Scholarship was established by Allen E. Hamburg, Class of 1939, in memory of his wife, Dorothy Gottschall Hamburg, Class of 1940, for students with demonstrated financial need who maintain at least a 3.00 (B) grade point average at Bucknell University. Preference for the scholarship award shall be given to students who graduated from Hatboro-Horsham Senior High School in Horsham, Pa.

The James H. Hand '26 and Edna Watson Hand '27 Scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The John H. Hare Scholarship was established in 1906 by his loving father. It is to be used to provide financial assistance to a worthy student planning to enter the ministry.

The Max and Bessie Harris Scholarship was funded by bequests from their daughter, Mary E. Harris, Class of 1920, and son, Louis H. Harris, Class of 1917. Awards from the scholarship shall be made to graduates of Lewisburg High School.

The John Howard Hart Scholarship was established by a bequest from Samuel A. Hart, Class of 1903.

The Andrew Hartman (Class of 1971) Scholarship was established in 2002 by the Ruth and Ted Bauer Family Foundation. The scholarship shall be awarded to students with demonstrated financial need who are United States citizens, with preference for students who are the sons or daughters of a public school teacher.

The Hartman and Sanders Family Scholarship was established in 2000 by Jill Sanders Hartman '75, John Hartman, the Hartman Foundation, Elizabeth Kulp Sanders '51 and Karen Sanders Feather '78, in memory of Daniel T. Sanders '52. The scholarship shall be awarded to students who are U.S. citizens with demonstrated financial need, with preference given to students of high academic standing, who are majoring in engineering, a physical science, or mathematics or who are majoring in education with specific intent to teach one of the above listed disciplines.

The Edwin Dudley Hartman Service Scholarship was established by gifts from the family and friends of Mr. Hartman, Class of 1970, the income to be used to aid students who desire to be of service to individuals and society and who are in serious financial need.

The Berkeley V. Hastings and Frances Steel Hastings Scholarship, established by a bequest from Berkeley V. Hastings, Class of 1913, and by contributions from George F. Hulse Associates, the income to be used for scholarships, with preference given to students coming from Milton, Pa., and its vicinity, and to preministerial students.

The Hauck Family Scholarship was established in 1999 by Edward A. Hauck, Class of 1975, to support the education of future Bucknell students. The scholarship honors his parents, Willard D. and Charlotte Y. Hauck, who, recognizing the value of education, made sacrifices to support his studies at Bucknell University. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Harold W. Hayden Scholarship was established by Stanley G. Williams, Class of 1943. The scholarship award will be made without restriction.

The Howard E. Hayden Memorial Scholarship was established in 2000 by his family. The scholarship shall be awarded to students with demonstrated financial need, with preference for students majoring in English, history or pretheological studies.

The William Randolph Hearst Foundation Scholarship Fund was established in 1998 by the William Randolph Hearst Foundation. The scholarship shall be awarded to a deserving first-generation student.

The Ephraim M. Heim Scholarship was established by Robert C. Heim, Class of 1924, in memory of his father, the income to be used for a deserving student, with preference given to those in business administration.

The Heinemann Family Scholarship was established by Kirsten S., Class of 1981, and Steven D. Heinemann. The scholarship shall be awarded to students with demonstrated financial need, with preference for students who are participants in intercollegiate athletics, and without other restriction.

The Catherine Vaughan Hellerman Scholarship was established by Stephen W. Vittorini, Class of 1979, in memory of his grandmother and great-grandfather, Charles P. Vaughan, acting president of Bucknell University in 1931. Preference for the scholarship award shall be given to a student or students from the Philadelphia area whose ethnic and economic origins add to the diversity of the University. It is the donor's wish that the scholarship recipient(s), upon graduation, expect to use their learned skills and knowledge to enhance the economic and cultural well-being of communities similar to those from which they were selected.

The Robert and Patricia Reish Hemphill Family Scholarship was established in 1999 by Robert B. Hemphill, Class of 1958, and Patricia Reish Hemphill, Class of 1959. The scholarship shall be awarded to students with demonstrated financial need, with preference for students from Union County, Pa.

The John W. and Amy M. Henneberger and Dr. Sara Chubb Schaaf '43 Scholarship was established by gifts from Dr. Lois M. Henneberger, Class of 1943, in memory of her parents and friend and classmate. The scholarship shall be awarded to students with demonstrated financial need, with preference for students in the premedical program who are juniors or seniors, and without other restriction.

The Ruth Mount Herrel Memorial Scholarship was established by Mrs. B. A. Ives, to honor the memory of her mother, a member of Bucknell's Class of 1921. Preference for the scholarship award will be given to returning and older students.

The Paul A. Hightower Scholarship was established by Stanley G. Williams, Class of 1943. The scholarship award will be made without restriction.

The Horace A. Hildreth Scholarship was established in 1999 by his daughter, Josephine H. Detmer, Class of 1952, to honor the memory of Mr. Hildreth, Bucknell's ninth president. The scholarship shall be awarded to students with demonstrated financial need with first preference given to students from Maine or who are enrolled in programs that may lead to careers in government service.

The C. Clayton Hill Ministerial Memorial, created by Norman B. Hill, Class of 1917, in memory of his brother, Class of 1929, provides that the income be awarded as a scholarship to a preministerial student who shows proficiency in the study of the Bible, and who is worthy of assistance.

The Hills Family Scholarship was established in 2004 by Frederick J. and Jean Lambert Hills, both Class of 1961, in memory of Robert and Katherine Hills. The scholarship award shall give preference to students enrolled in the College of Engineering.

The William A. Hinkle '48 Memorial Scholarship was established by Patricia Hungerford Hinkle, his wife, for the support of an upperclass student in chemical engineering.

The Robert Hoff Family Scholarship was established in 2000 by Robert A. Hoff, Class of 1974. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Benjamin Hoffman Scholarship was established by the family in memory of Benjamin Hoffman, Class of 1952, the income to be awarded to any student who displays financial need.

The Holmes Family Diversity Scholarship was established in 2003 by Stephen P. Holmes and Bonnie L. Holmes, both members of the Class of 1979. Grants from the scholarship will be awarded to students whose ethnic, racial, economic, geographic, cultural, or national origins add to the diversity of Bucknell

The Daris Bracey Hosler Scholarship was established in 1999 by Daris Bracey Hosler, Class of 1931. The scholarship shall be awarded to students with demonstrated financial need, with preference given to students majoring or minoring in the classics.

The Marguerite Brierly Hough Scholarship was established by an estate gift from Mrs. Hough, Class of 1923, in recognition of the benefits she received from the University. Preference for the scholarship award will be given to junior and senior students in the College of Engineering.

The Alfred C. Howell Scholarship was established by John R. Gregg in memory of his step-father Alfred C. Howell, a former trustee of Bucknell University. Mr. Howell's love of poetry and his life-long interest in book collecting prompted the guidelines for this scholarship. The scholarship shall be awarded to students with demonstrated financial need who are majoring in English.

The Charles E. Howell Memorial Scholarship was established by Bucknell students under the auspices of the Bucknell Student Government, and by the friends and family of Charles Howell, a member of Bucknell's Class of 1990. As a minority student, an academically superior engineering student, football player, and outstanding citizen of the University community, Charles Howell set an example for all Bucknellians. This scholarship will be awarded annually to a student who best represents the qualities Charles exhibited before his untimely death in 1987.

The Hoyt Family Scholarship was established by Brian Hoyt, BS and BA Class of 1987, MS Class of 1992, and his wife, Carolyn Merl Hoyt, BS Class of 1987, through the generosity of George W. Hoyt. In keeping with the significant opportunities that the five-year engineering program provided Brian, the scholarship shall be awarded to an engineering student, with preference given to a student enrolled in the five-year engineering program in liberal arts and engineering, and first preference given to students in their fifth year of that program.

The Robert D. Hunter Scholarship was established in 1991 by members of Accounting Firms Associated, Inc., to honor one of its founders, Robert D. Hunter, a member of the Class of 1949 and a University trustee from 1973-78, on the occasion of his retirement. Preference for the scholarship award shall be given to a junior or senior student majoring in accounting who plans to become a certified public accountant.

The Idleman Family Scholarship was established by Lee H. Idleman, Class of 1954. The income is to be awarded to worthy and needy students, and without any restrictions.

The George A. and Frances M. Ingald Scholarship was established by their daughter, Carol Anne Ingald, Class of 1978, in honor of their 50th wedding anniversary. The scholarship shall be awarded to students with demonstrated financial need, with first preference for students majoring in pre-veterinary medicine, and second preference for students majoring in mechanical engineering or economics.

The Helen Shaffer Iredell Scholarship was established by an estate gift from Charles V. Iredell, Class of 1920, in memory of his wife, Helen Shaffer Iredell, Class of 1918. The scholarship award shall be made without restriction.

The Joan Carol Jacobsen Scholarship for the Arts was established in 2007 as an endowed scholarship by action of the Board of Trustees out of a residuary bequest from the estate of Joan Jacobsen, Class of 1952. Awards from the scholarship shall be granted to art students.

The Robert F. Jaegle Memorial Scholarship shall be awarded to meritorious students with need, majoring in accounting.

The Frances Theiss James Scholarship was established by T. Garner James in memory of his wife, a member of the Class of 1940. The scholarship award will be made without restriction.

The Edward F. Johnson Jr. Scholarship was established by relatives and friends in memory of Edward F. Johnson Jr., Class of 1951, the income to be used to aid a worthy and needy student.

The Lloyd H. Jones/Lehigh Electric Engineering Scholarship was established by Lloyd H. Jones, ME '72 and Lloyd Jones, EE '49. The scholarship shall be awarded to students with demonstrated financial need, who are pursuing engineering degrees and are U.S. citizens, with a preference for students in the mechanical or electrical/electronic engineering departments.

The Lewis E. Jones Scholarship was established by a legacy of Lewis E. Jones for a student of Welsh descent.

The Rockefeller Jones Fund was bequeathed to the University by a legacy of Elizabeth B. Jones in memory of her husband, Thomas Rockefeller Jones, Class of 1862, the income to be used as scholarships for two young men of good moral character.

The John T. Judd Scholarship was established by a bequest of Anna C. Judd in memory of her father, John T. Judd; it is to be made available to Baptist students of good character.

The Dr. John T. Judd General Scholarship was established by his grandson, James W. Shields, to honor Dr. Judd and the many members of the Shields family who have graduated from Bucknell University. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Deborah Juran Scholarship was established by Deborah Juran, Class of 1971. Preference for the scholarship award will be given to worthy students of demonstrated financial need, with first preference given to residents of Dauphin County, Pa., or its surrounding counties.

The Edith Phillips Kalp Scholarship was established by Margaret E. Kalp in memory of her mother, the income to be awarded annually to such individual as the Scholarship Committee deems advisable.

The William Lawrence Kalp Scholarship was established by Margaret E. Kalp in memory of her father, the income from which is to be awarded annually to such individual as the Scholarship Committee deems advisable.

The Dr. Carl G. Kapp Memorial Fund was established through a bequest from Irma Kapp Rich, in memory of her brother, a member of the Class of 1925. The income from this fund shall be used to provide interest-free loan awards to deserving students who are enrolled in the premedical program, have completed their freshman year in this curriculum, and have demonstrated financial need. Student recipients of a loan award have a moral, but not legal obligation to repay the loan award when they are able.

The Clara M. Kauffman Scholarship was established by a bequest from Carson W. Kauffman, Class of 1940. Preference for the scholarship shall be given to students of good character and high scholastic standing enrolled in the College of Engineering, or in science

programs. Students who are orphaned or who have but one living parent shall receive first consideration.

The Keech Family Scholarship was established by Rev. Dr. Finley M. Keech, Class of 1949, and Catherine L. Keech, Class of 1947, in memory of his father, Rev. Dr. Finley Keech, Class of 1922 (D.D. 1942), Mary Elizabeth Peifer Keech, Class of 1924, and his uncle, George T. Keech Jr., Class of 1915. The scholarship shall be awarded to students with demonstrated financial need and without further restriction.

The Alexis W. Keen Scholarship was established by an estate gift from Mr. Keen, Class of 1913. The scholarship award will be given to students residing in Wayne Township, Passaic County, N.J.

The Allan and Bette Kenzie Scholarship was established in 2000 by Allan G. and Bette Skow Kenzie ’57/’56. The scholarship shall be awarded to students with demonstrated financial need, with preference for students whose ethnic, racial, economic, or national origins add to the diversity of Bucknell University.

The W. K. Kellogg Foundation Scholarship was established by the W. K. Kellogg Foundation, for women preparing to enter nursing or medical technology.

The Edward Gridley Kendall Scholarship was established by a bequest from Grace W. Kendall, in memory of her husband, to be used to aid deserving men.

The S. Bruce and Betty Eyler Kephart Scholarship was established by S. Bruce Kephart, M.D., Class of 1939, and his wife, Betty Eyler Kephart, Class of 1940. The scholarship award will be made without restriction.

The M. Elizabeth King Scholarship was established through a gift from Elizabeth King, Class of 1934. The scholarship award will be made to students with demonstrated need and without other restrictions.

The Arthur D. Kinney Scholarship was established by Arthur D. Kinney Jr., Class of 1956. Preference for the scholarship award shall be given to students who are scholar-athletes with demonstrated financial need.

The Obadiah W. Kitchell Scholarship was established by a bequest from Obadiah W. Kitchell, an honorary degree recipient in 1899, with preference given to graduates of the East Orange High School, in New Jersey.

The Grace and Stanley Kitzinger Scholarship was established in 2000 by Grace Livengood Kitzinger ’49. The scholarship shall be awarded to full-time sophomore, junior, or senior students of high scholastic merit with demonstrated financial need, with preference for students majoring in biology. The student recipients should be United States citizens.

The Klaber Family Scholarship was established by Richard D. and Judith Beattie Klaber ’55/’55 and their children, Bethany Klaber Succop ’80, R. Douglass Klaber Jr. ’86, and Andrew B. Klaber ’87. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Richard A. Klein Scholarship was established in 2000 by Richard A. Klein, Class of 1969. The scholarship shall be awarded to students with demonstrated financial need, with preference for those who have elected a major or minor in theatre or dance, or who are active participants in the University's theatre programs, and without other restriction.

The Kleinert-Wagner Scholarship was established by Richard and Susan Kleinert, Classes of 1974 and 1975, in honor of their parents, Frederick and Donna Wagner and Robert and Jane Kleinert. It is the donors' preference that the scholarship award be made to Christian students of music or electrical engineering.

The Marie R. Kline Memorial Scholarship was established by Raymond D. Kline, Class of 1919, to honor the memory of his wife. Preference for the scholarship award will be given to students from the Lewisburg area.

The Klock Family Scholarship was established by Lawrence S. Klock, Class of 1969, and his wife, Cheri Klock, in honor of his parents, Grace and Charles Klock. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Koandah Scholarship was established by James M. Sanborn and Emilie Sherman Sanborn, Class of 1955, in honor and memory of Sholl and Sherman family members who have attended Bucknell University. The scholarship shall be awarded, in compliance with the University's policy of non-discrimination, to qualified students who could not otherwise afford an education at Bucknell University, and who would, as Bucknell students, add to the economic, ethnic, racial, cultural, and national diversity of the University.

The Helen Morton Koons Scholarship was established in 2000 by her daughter, Helen E. Koons, Class of 1971. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The John Arthur Koons, Class of 1900, Memorial Fund was established by a bequest of Josephine Bonham Koons, the income to be used to aid residents of Pennsylvania.

The Samuel J. Koons Scholarship was established by Helen E. Koons, Class of 1971, his daughter, and Helen Morton Koons, Class of 1925, his wife. Preference for the scholarship award shall be given to science or engineering student residents of Pennsylvania.

The Kress and Warg Endowment was established by a legacy of Clara L. Warg to endow scholarships in memory of Jack Culberson Kress and Clara L. Warg, for the education of needy young men.

The Paul Kreutzpointer Scholarship was established by Mrs. Annie Kreutzpointer in memory of her husband.

The Clarence M. and Henrietta H. Kriner Memorial Scholarship was established by their daughter, Sara Kriner Goodman, Class of 1950, in memory of her parents, Clarence M. and Henrietta H. Kriner, Class of 1917. Preference for the scholarship award will be given to students in the College of Engineering.

The Daniel G. Krise Scholarship was established by Daniel H. Krise, Class of 1899, for a student preparing to teach in the public schools of Pennsylvania.

The Johanna Kunkel Memorial Scholarship was established by Florence Hohnbaum Harvey, Class of 1939, to honor the memory of her aunt who made possible her education at Bucknell.

The Kenneth G. Langone Scholarship was established at the 20th anniversary of Mr. Langone's company, Invemed Associates, by Walter W. Buckley Jr., to honor and recognize the many contributions of Mr. Langone. Preference for the scholarship award shall be given to students who have evidenced high integrity, loyalty, and steadfast determination in their daily lives.

The Katherine B. Larison Scholarships were established by Katherine B. Larison, of the Institute Class of 1867, and were supplemented by the General Alumnae Association of the University. They are for women of exemplary character.

The Mabel Irwin Lavers Scholarship was established in 2001 by a bequest from Theodore H. Lavers, Class of 1929, to honor the memory of his wife, a graduate of the Class of 1930. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Lawlor Family Scholarship was originally established as the Doris Tucker Memorial Scholarship by Stuart Tucker and Scott Lawlor '86, to honor the memory of a wife and mother. In 2006, the scholarship was renamed and additional contributions were received from Scott Lawlor '86 and his wife, Elena Lawlor. The scholarship award was redirected to students with demonstrated financial need whose life experiences contribute to the cultural and ethnic climate of the campus, including first-generation college students, students from outside the University's traditional geographic area, and those who bring cultural and ethnic diversity to the campus.

The Charles J., Filomena and Dr. Charles J. Leagus Jr. '53 Memorial Scholarship was established under an agreement completed in 2004 and funded by Dolores Leagus Clark, M.A. 1953, to preserve and honor the memory of her parents and brother. The scholarship shall be awarded to students without restriction.

The Ledgerwood Family Scholarship was established in 2007 by William C. Ledgerwood '74 and D. Leanne Trout Ledgerwood '74 in honor of family members who are also Bucknell University graduates. The scholarship shall be awarded to students with demonstrated financial need. The scholarship award shall be made without restriction.

The Dr. Leiser Foundation Scholarship, established by a bequest from Dr. William Leiser III, Class of 1909, recognizes the medical services provided for the citizens of Lewisburg by three generations of the Leiser family, including the donor; his father, Dr. William Leiser Jr.; and his grandfather, Dr. William Leiser.

The William Forrest Lenker Scholarship was established by members of the Kappa Sigma fraternity to honor William Forrest Lenker, Class of 1956, on the occasion of the centennial celebration of the Alpha Chi chapter of the Kappa Sigma fraternity. The scholarship award shall be given to students with demonstrated financial need, with preference for members of the Kappa Sigma fraternity who have demonstrated exceptional scholarship, leadership, and service to Bucknell University and the community.

The Ira A. Levin Scholarship was established by Ira A. Levin, Class of 1952, in memory of his parents. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Rosetta Miller Lewis Scholarships were established by a bequest from Rosetta Miller Lewis.

The Warren "Bud" Lewis Scholarship was established by his wife, Gladys Rowland Lewis, children, and friends to preserve his memory. The scholarship award will be made without restriction.

The Peggy and Bob Ley Scholarship was established by Margaret Hollinshead Ley, Class of 1960, and her husband, Robert Ley. The scholarship shall be awarded to students with demonstrated financial need, with first preference given to students who have been historically under-represented at Bucknell University.

The William L. Litchfield Scholarship was established by Marcia Litchfield Martell, Class of 1973, and Sharon Litchfield Spencer, Class of 1975, in memory of their father, William L. Litchfield, Class of 1928. Preference for the scholarship award shall be given to student-athletes.

The Margaret B. Livingston Scholarships, established by a bequest from Margaret B. Livingston, are for preministerial students recommended by the department of religion.

The Marguerite D. Lofft Memorial Scholarship was established by Henry T. Lofft, Class of 1917, in memory of his wife. In awarding the scholarship, preference will be given to worthy civil engineering students.

The Esther B. Long Memorial Scholarship was established to honor the memory of Esther B. Long, Class of 1947, by her son, Morris A. "Andy" Long, Class of 1949, and her daughter-in-law, Helena J. Long. In recognition of Esther Long's lifetime of service as director of Bucknell's dining service, the scholarship shall be awarded to students with demonstrated financial need, with preference for students who are employed by the University's dining service, or who are geology majors.

The O. W. Longan Scholarship was established by a bequest of O. W. Longan, Esq., for a student who plans to enter the ministry and who lives in Lycoming County, Pa.

The Shaw Loo Memorial Scholarship was established in 1998 to commemorate the 140th anniversary of Shaw Loo's arrival on campus from Burma, as Bucknell's first international student. The scholarship also marks the historic ties of Bucknell University to the nation and people of Burma, extending back to the University's founding in 1846.

The Horace A. and Antoinette M. Lowe Scholarship was established through a bequest from Horace A. Lowe Jr. , Class of 1940, and his wife, Antoinette. The scholarship award shall be made without restriction.

The Alma Lowry Scholarship Fund was established by the bequest of Alma Lowry Williams and is named for her and for her maternal grandmother, Alma Lowry, whose cousin, Stephen W. Taylor, wrote the Charter of the University and served as Acting President. Income from the fund is to be awarded to students in the fields of religion, medicine, teaching, humanities, and the fine arts, especially in music. No part of the fund may be used for athletic activities or promotion.

The W. Norwood Lowry Scholarship was established by a gift from Robert Lowry Stanton, Class of 1940. Preference for the scholarship award will be given to worthy students majoring in physics or mathematics.

The Francis X. Lucarelli Scholarship was established in memory of this distinguished member of the Class of 1962 by members of the Lucarelli family for the purpose of providing financial assistance to worthy and needy students.

The Lewis Frederick Lyne Jr. Mechanical Engineering Scholarship was established by a bequest of Lewis Frederick Lyne Jr., Class of 1914, the income to be available to men who are students in mechanical engineering and who are also members of the Sigma Chi fraternity.

The Betty Ann Waddington Mackey Scholarship was established by Betty Ann Waddington Mackey, Class of 1948, and her husband, Howard D. Mackey. The scholarship is established in Betty Ann's honor and in gratitude for what Bucknell University has meant in her life. The scholarship is to be awarded to students with demonstrated financial need, with preference given to students majoring in psychology.

The Malesardi Scholarship was established by gifts of the Malesardi Foundation and Robert E. Malesardi, Class of 1947, the income to be used to aid students with demonstrated need. Preference is to be given to qualified candidates from Elk County, Pa.

The Joseph Earl Malin Scholarship was established by a bequest of Dolly Frey Malin in memory of her husband, Joseph Earl Malin, Ph.D., Class of 1916. It is to be awarded to worthy young men who are majoring in chemistry.

The Malone Family Scholarship was established by J. Gilbert Malone, Class of 1927, in memory of his mother, Mary Ruff Malone, and his wife, Mary Gerlash Malone. The scholarship award shall be made without restriction.

The E.R. and E.M. Manchester Scholarship was established through a bequest from Elizabeth M. Manchester, Class of 1935. The scholarship award shall be made without restriction to students with demonstrated financial need.

The Arnaud C. Marts Scholarship Fund was established by contributions from students, faculty, administration, family, and friends as an expression of appreciation of President Marts' service to the University. The income is to be used as a scholarship for deserving students.

The Franklin Mathews Service Scholarships were established for male students by Franklin Mathews, Class of 1868.

The Christy and Jane S. Mathewson Scholarship was established by Jane S. Mathewson, and it is to be awarded to a student who is in financial need; who possesses special ability in mathematics; who has shown integrity and dependability; and who has participated in the school's activities, especially in athletics.

The Janet B. Mathias Scholarship was established by Janet B. Mathias, Class of 1966. The scholarship shall be awarded to students with demonstrated financial need, with preference for students enrolled or meaningfully involved in the visual or performing arts, and without other restriction.

The John H. and Susan B. Mathias Scholarship was established by John H. '69 and Susan B. Mathias '69, and honors the extensive ties of the Mathias family to Bucknell University. Preference for the scholarship award shall be given to students whose ethnic, racial, economic, or national origins add to the diversity of Bucknell.

The J.P. Mathias Scholarship was established by Margaret Blair Mathias, Class of 1936, to honor the memory of her husband, J.P. Mathias, Class of 1935. Preference for awards from this scholarship shall be given to varsity student-athletes with demonstrated financial need, selected by the director of athletics and the coaches.

The Andrew Wray Mathieson Scholarship, named for Mr. Mathieson, a member of the Bucknell Board of Trustees and the Class of 1950, was established by his children, Margaret A., Class of 1977, Andrew F., and Peter F., Class of 1983, to honor his many contributions to and deep devotion for the University, and in honor of his father, Andrew R. Mathieson, Class of 1920. Preference for the scholarship award will be given to residents of Allegheny County or other southwestern Pennsylvania communities.

The Barry R. and Marjorie A. Maxwell Scholarship was established in 1998 to express the respect and affection of friends and associates of the Maxwells, on the occasion of Barry Maxwell's retirement as vice president for administration at Bucknell University. The scholarship shall be awarded to students with demonstrated financial need, with preference for students in engineering, and without other restriction.

The Leila Preston McCain Scholarship was established by a gift from Donald R. McCain, Class of 1905, to be awarded annually to a woman who is a member of the senior class, who is of high moral character, and whose scholastic record is superior.

The John Lehy McCarthy Memorial Fund was established by a bequest of Elizabeth B. McCarthy, Class of 1917, in memory of her son, the income to be used to aid any worthy students in need.

The Eleanor Golightly McChesney Scholarship was established by Joann Golightly Brown, Class of 1948, in memory of her sister, Class of 1946. Preference for the scholarship award will be given to a student who pursues or plans to pursue a major in any branch of either the physical or biological sciences.

The Marti L. McCord Scholarship was established in memory of Marti Lynn McCord, Class of 1963, who died shortly after graduation. The scholarship award shall be made without restriction.

The Shirley Jane McCreary Scholarship was established by Ralph W. McCreary in memory of his daughter, a member of the Class of 1952. The awarding of this scholarship is based primarily on need and preference is given to students planning a career in nursing or medicine.

The Frank and Edna Keen McCrina Memorial Scholarship was established through a bequest from Mary McCrina Miller, Class of 1940, in memory of her parents. Preference for the scholarship will be given to students majoring in the humanities.

The Gilbert G. McCune Leadership Award was established by Mr. McCune, Class of 1927. The award recognizes the importance of extracurricular achievement through scholarship aid to seniors who have brought honor to the University by their activities outside the classroom.

The William D. McFarlan Jr. Scholarship was established by a legacy of William D. McFarlan Jr.

The George V. McGee Investment Studies Endowment was established in 2002 by The Charles Foundation, Inc., a Rooke Family Private Foundation, to honor George B. McGee, Class of 1938, a friend of Robert C. Rooke. The endowment provides merit-based grants to students who demonstrate potential as future professionals engaged in the fields of finance

and investment. Students selected as McGee Scholars must hold a record of superior academic achievement, contributions to the University community, and successful participation in finance-or investment-related internships, employment or other activities.

The Mark Ryan McGinly Memorial Scholarship was established in 2007 in memory of Mark R. McGinly who lost his life on September 11, 2001, in the New York City World Trade Center. The scholarship was launched by the Mark Ryan McGinly Memorial Scholarship Fund in Vienna, Virginia, the McGinly family and Mark's many friends to commemorate the 10-year anniversary of the Class of 1997. Mark was a very proud Bucknell graduate and made many wonderful friends, fond acquaintances and valued business associates as a result of his Bucknell University experience. Preference for the scholarship shall be given to deserving undergraduate students with demonstrated financial need who are majoring in management.

The Richard G. McGinnis International Engineering Study Scholarship was established in 2006 by Debra Anderson Apruzzese '80 and John J. Apruzzese '80, and Louis and Angelika Anderson, to honor Professor McGinnis, who successfully pursued his vision to expand the Bucknell engineering experience to include international study. The scholarship provides assistance for Bucknell engineering students to travel and study outside the United States. Awards shall be made to full-time students who demonstrate that their international study program is a valuable addition to their on-campus experience, and who have demonstrated financial need.

The Alex G. McKenna Scholarship was established in memory of Mr. McKenna by his children, Linda McKenna Boxx, Class of 1974, and David E. McKenna, Class of 1973. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Newman Frederick McKinney-Jennie Owens McKinney Memorial Scholarship Fund was established by Newman F. McKinney, Class of 1928, and his wife, Jennie Owens McKinney, Class of 1930, to provide scholarships in civil engineering in honor of Newman Frederick McKinney and William McKinney; in history in honor of Jennie Owens McKinney; in premedicine in honor of Charles Owens; in English in honor of Anna Maude Lobaugh Owens; in education in honor of Blanche Newman McKinney; and in psychology in honor of Thomas Gilespie McKinney.

The William D. and Dorothy O. McRae Scholarship Fund was established in 1979 by chapel choir alumni and friends, the income to be awarded to a worthy vocalist, organist, or other musician, with preference for a member of the chapel choir, as recommended by the director of the chapel choir and the department chair of music.

The Meerwarth Scholarship was established by a gift from Lurenna M. Meerwarth and her daughter, Tracy L. Meerwarth, Class of 1996. Preference for the scholarship award shall be given to students majoring in biology who are United States citizens.

The Herbert L. Merin Scholarship was established in 1998 by Andrew J. Merin, Class of 1970, to honor his father. Although Herbert Merin never attended college, he had a reverence for education. The scholarship was created to reflect the gratitude of his son for granting him the opportunity to attend Bucknell and to follow his father's instructions to always pay back those institutions that have helped him along the way. The scholarship shall be awarded to students who are judged to have the most pressing demonstrated financial need, and without other restriction.

The Sara Chandler Merrick Scholarship was established in memory of their daughter by Grace Milhous Merrick, Class of 1927, and J. Leon Merrick, the income from which is to be used to provide financial aid for a deserving undergraduate selected by the University in accordance with established scholarship policies. Preference shall be given to students from southeastern Pennsylvania, especially those from the Kennett Square area.

The Florence Beckworth Miller '27 Memorial Scholarship was established in 2002 by her sister, Evelyn M. Beckworth, Class of 1930, to honor Florence's outstanding academic performance in her pre-med studies. The scholarship shall be awarded to students with demonstrated financial need with preference given to students planning to pursue a career in medicine who are also United States citizens.

The Lois Cullen Miller '54 Chemistry Scholarship was established in 2005 by Eugene Miller. The scholarship shall be awarded to students with demonstrated financial need, with preference for upperclass students who are majoring in chemistry.

The Miller Family Engineering Scholarship was established through a bequest from John W. Miller, Class of 1943, as a tribute to his brothers, Clyde L. Miller, Class of 1931, and C. Guy Miller, Class of 1935. Preference for the scholarship award shall be given to students with demonstrated financial need in the College of Engineering.

The Jacob H. Minick Fund was established by a bequest from Jacob H. Minick, Class of 1891, the income of which is to be given each year to students who, because of some physical difficulty, are forced to use crutches during all of their college work.

The Moll-LaBar Family Scholarship was established by Bruce A., Class of 1954, and Marion Moll LaBar, Class of 1956. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Frederick C. Moor Jr. Scholarship was established by Stanley G. Williams, Class of 1943, and his wife, Doris, in memory of F.C. "Doc" Moor, aviation pioneer and powerboat racing champion. The scholarship award will be made without restriction.

The James Moore III Scholarship was established for descendants of the family.

The Dorothy H. and Peter F. Morgantini Scholarship was established by Dorothy Harris Morgantini and Peter F. Morgantini, both members of the Class of 1987. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Edmond N. and Virginia H. Moriarty Scholarship was established by Virginia Moriarty and Edmond Moriarty, trustee. The scholarship shall be awarded to returning students with demonstrated financial need, with preference for students who need assistance due to a sudden financial loss, such as parental unemployment, disability or the death of a family member or other causes, and without other restriction.

The Morrell Family Scholarship was established by James J. and Karen Olsson Morrell, both members of the Class of 1974, to honor the Rev. James D. Hammerlee, who served Bucknell for 26 years and was a friend and mentor to both. Preference for the scholarship award shall be given to students with demonstrated financial need and without other restriction.

The Ann M. Morrison Scholarship was established by Ann M. Morrison, Class of 1970, and Steven J. Pitchersky. The scholarship award shall be made without restriction.

The Carl M. and Kathryn W. Moyer Scholarship was established by Kathryn W. and Carl M. (M.S. 1969) Moyer. The income earned by the scholarship is to be used to provide emergency assistance to students who have experienced sudden financial loss through the death of a family member, or for other causes, and who could not continue their education without such scholarship aid.

The Earle L. and Christine Sterner Moyer Memorial Scholarship was established by Christine Sterner Moyer, Class of 1928, and enhanced by additional contributions from her son, William S. Moyer, Class of 1957, and daughter-in-law, Joan F. Moyer. Preference for the award shall be given to needy and deserving students.

The Mt. Pleasant Institute Scholarships Fund was established through the merger of the Western Pennsylvania Classical and Scientific Institute at Mt. Pleasant with Bucknell University, as a memorial of long and faithful service to the Mt. Pleasant Institute by Leroy Stephens, A.M., D.D., Class of 1868, a Bucknell trustee for 40 years. The fund provides an endowment for awarding undergraduate scholarships to students of ability and character who are worthy of financial assistance, preference being given to Baptist students; or to students of Baptist antecedents, living in western Pennsylvania. As a result of the merger in 1936, the following endowed scholarships were established:

The Nathaniel S. Houseman Scholarship

The Nelson Weddle Jr. Scholarship

The Sarah Ann Trevor Scholarship

The Leroy Stephens Scholarship

The Malcolm E. Musser Scholarship was established by gifts of the Robert L. Cooley family, and is to be awarded to a student who is an outstanding golfer.

The Geoffrey P. and Barbara F. Mynott Scholarship was established by Geoffrey P. and Barbara Folk Mynott ’54/’56. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Eleanor Nachshin Scholarship was established by Robert J. Nachshin, Class of 1972, and his wife, Monica Lipkin. The recipient shall be selected in the following order of preference: 1) juvenile (Type I) diabetes; 2) other form(s) of diabetes; 3) sight impairment so as to be unable to read; 4) kidney transplant or renal dialysis; 5) diseases or disabilities similar to those caused by juvenile diabetes.

The Ross J. Nahrgang Scholarship was established by Mrs. Anne Horoschak Nahrgang, B.S., M.D., Class of 1923, as a memorial to her son, the income to be used to aid one or more women students, preferably in the premedical program.

The Richard Nathan Scholarship was established through a bequest from Richard Nathan, Class of 1939. The scholarship award will be made without restriction.

The Neuville Family Scholarship was established by Stephen B. Neuville, Class of 1957. Preference for awards from the scholarship will be given to students residing in the southeastern United States; awards will be made without other restriction.

The Newcomb Family Scholarship was established by William Y. Newcomb, Class of 1936, his wife, Mary VanKirk Newcomb, Class of 1934, and their sons, William A. Newcomb, Class of 1965, and L. Kirk Newcomb, Class of 1968. The scholarship award shall be made without restriction.

The S. Yvonne Novak Scholarship was established by Darryl L. Novak, Class of 1963, Sigrid Christensen Novak, Class of 1964, and Lars and Margo Novak. The scholarship award shall be given to students with demonstrated financial need, with preference given to young adults with insulin dependent, type I diabetes.

The Dennis and Judith O'Brien Scholarship was established by friends and colleagues in honor of Bucknell's 12th president and first lady, the income to be used to provide one or more scholarships for undergraduate students in the humanities.

The Merle M. and Frances B. Odgers Scholarship Fund was established by the Bucknell Parents Association and others in honor of the former president and Mrs. Odgers, the income to be used to provide one or more scholarships for undergraduate students.

The Margaret Tustin O'Harra Memorial Scholarship was established in 2006 as an endowed scholarship by action of the Board of Trustees out of a residuary bequest from the estate of Helen F. O'Harra. The scholarship is intended to honor the memory of Helen's mother-in-law, Margaret Tustin O'Harra, and shall be awarded to students without restriction.

The J. Orin Oliphant Scholarship was established by Edward G. Hartmann, Class of 1937, and other students and colleagues of Dr. Oliphant, the income to be used for a student majoring in the humanities, preferably in history.

The Oristaglio Family Scholarship was established in 1999 by Stephen M. Oristaglio, Class of 1977. The scholarship shall be awarded to students with demonstrated financial need, with preference for varsity scholar-athletes who have an interest in the arts.

The Sally J. and R. Lyman Ott Scholarship was established by R. Lyman Ott Jr., Class of 1962, Sally J. Clute Ott, Class of 1964, Kathryn A. Ott, Class of 1991, and Curtis L. Ott. Preference for the scholarship award shall be given to students who are varsity soccer team members and who are majoring in the liberal arts.

The Esther Owens Scholarship was established by a gift of Miss Esther Owens.

The William G. Owens and Jeannette W. Owens Scholarship was established by William G. Owens, Class of 1880, to perpetuate the interest of his wife, Jeannette W. Owens. It is to aid students who have committed themselves to serve in foreign missions under the supervision of the Baptist Church, and is to be awarded to students who are of good character and who need financial aid.

The William G. Owens Scholarship was established by his daughter, Jeannette Owens Burnet, Class of 1917, in memory of her father, Professor William G. Owens, Class of 1880, who taught the physical sciences at Bucknell for over 50 years. It is to be used to help worthy students, a preference given to those who are majoring in chemistry.

The Parks Family Scholarship was established by Marilyn Olson Parks, Class of 1968, and her husband, Robert W. Parks, Class of 1966. The scholarship award shall be made without restriction.

The Judy Parsons Memorial Scholarship was established by the Bucknell Student Government, with contributions from the family and friends of Judy Parsons, Class of 1988, to honor her memory. Preference for the scholarship award will be given to physically handicapped students.

The Pascucci Family Scholarship was established by Michael C. Pascucci, Class of 1958. Preference for the scholarship award shall be given to students with demonstrated financial need, and without other restriction.

The Paulis Family Scholarship was established in 1993 by the family of Dara M. Paulis, Class of 1993, Bradley D. Paulis, Class of 1989, and his wife, Nancy Neu Paulis, Class of 1988, as an expression of their appreciation for the educational opportunity given to them at Bucknell and to the glory and honor of God who made it possible. Preference for the scholarship award shall be given to a United States citizen who meets high academic standards, displays financial need, and demonstrates community involvement.

The James N. Patterson Scholarship was established by James Patterson, M.D., Class of 1924. The scholarship award will be made without restrictions to support the Bucknell education of students with demonstrated financial need.

The Dr. Joseph and Elizabeth Pennino Memorial Scholarship Fund was established by a bequest of the late Elizabeth Pennino, the income of which provides a scholarship for a student enrolled in the civil engineering department.

The Pettit Family Scholarship was established by Raymond F. Pettit, Class of 1953. The scholarship shall be awarded to students with demonstrated financial need, with preference for student-athletes.

The Joseph W. Peyser Scholarship Fund, established by a bequest from Joseph W. Peyser, the income to be used to aid worthy students who are graduates of the high school of the Shikellamy School District and who have been residents of Northumberland for at least three years prior to high school graduation.

The Philadelphia Alumnae Scholarship was founded by the Philadelphia Alumnae Club, for a woman who lives in Philadelphia.

The Llewellyn Phillips Scholarship was established by a friend in memory of Professor Llewellyn Phillips, Class of 1892, for a student contemplating a life's work in a Christian vocation.

The Emil J. and Elva E. Polak Memorial Scholarship was established by gifts from friends, family, colleagues, and former students of Emil J. Polak, professor of mathematics and astronomy at Bucknell from 1954-84, and his wife, Elva Elze Polak. Preference for the scholarship award shall be given to students majoring in mathematics or astronomy.

The Arky Pollokoff Memorial Scholarship was established in 2001 by the family, friends and classmates of Arky Pollokoff, Class of 1978, to honor his memory. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Post Family Scholarship was established by Robert M. Post, Class of 1954, and Anne Prosser Post, Class of 1956. The scholarship award shall be made without restriction.

The Harvey M. Powers Scholarship was established by Jane Brown Maas, Class of 1953, to honor the memory of Harvey Powers, director of Bucknell's theatre program from 1949 until 1986. The scholarship shall be awarded to students with demonstrated financial need, with preference for those who have elected majors in theatre or who are active participants in the University's theatre programs, and without other restriction.

The Nancy B. Prial and James D. Pavlekovsky Scholarship was established in 2000 by Nancy B. Prial, Class of 1980, and her husband, James D. Pavlekovsky. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The PricewaterhouseCoopers Scholarship was established by Jeb and Sally Stoner Bachman '78/'78, Frank and Susan Stoner Brown '78/'78, and the PricewaterhouseCoopers Foundation to provide scholarship support to outstanding students interested in career opportunities in the field of accounting.

The Puff Family Scholarship was established in honor of Dr. Robert C. Puff '42 and Mrs. Isabel Clark Puff '43, by their children and spouses: Robert C. Puff Jr. '67 and his wife, Nancy Larzelere Puff '69; Barbara Puff '69, Sally Puff Courtney '74, and Jeffrey V. Puff '75 and his wife, Rae Ann Puff. Awards from this scholarship shall be used to recruit students with demonstrated financial need and exceptional academic promise. The scholarship is intended, where possible, to provide the entire financial need of selected recipients, thereby eliminating or reducing their need to become indebted with loans for financial aid, or to take time away from collegiate pursuits for work. It is the donors' hope that students selected to receive grants under this agreement will use the time saved from such extra work obligations to excel in academic efforts and engage actively in the life of the University through participation in service organizations, student government, social clubs, the arts, athletics, etc.

The Ann Purcell Scholarship was established by Ann Sundberg Purcell, Class of 1953. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Betty Ann Quinn Scholarship Fund was established by the Bucknell chapter of the National Association for the Advancement of Colored People, the income to be given to a worthy black student.

The Dayton Ranck Scholarship was established out of respect for and in memory of Dayton Ranck, a former vice president of the University and a member of the Class of 1916. The income is to be given to a student in need of financial assistance.

The Rasmussen Family Scholarship was established in 1999 by Warren and Nancy Rasmussen, past parents '79. The scholarship shall be awarded to students with demonstrated financial need, with preference for an engineering student who is a (1) resident of Illinois or (2) resident of a Midwestern state. If neither preference can be met, the award shall be made without restriction.

The Milton M. Ratner Scholarship Fund was established by the Milton M. Ratner Foundation to provide scholarship aid to needy students who could otherwise not attend a private university.

The Henry M. Reed '44 Scholarship was established in 2000 by Henry M. Reed, Class of 1944. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Marian McIlnay Reed Scholarship was established by Marian M. Reed, the income to be used for the education, or for the support and maintenance during the period of such education, of worthy and capable students.

The Robert G. Reed Memorial Scholarship was established in 2007 by his mother, Mary Ann G. Reed, his aunt, Jane W. Griffith, other members of his family, and friends, to honor and preserve his memory. Robert graduated in 1972 with degrees in engineering and business. The scholarship shall be awarded to students with demonstrated financial need, with preference for students enrolled in the College of Engineering.

The Robert L. and Elva K. Reitz Scholarship was established by Robert L. Reitz, Class of 1938, and Elva K. Reitz. The scholarship award will be made with preference given to student-athletes.

The Edward J. and Patricia C. Reitzel Scholarship was established by Edward J. Reitzel, Class of 1961, and his wife, Patricia C. Reitzel. The scholarship shall be awarded to students with demonstrated financial need with preference for student-athletes.

The Leon J. Rhodes Scholarship, established by the estate of Leon J. Rhodes, Class of 1932, shall be awarded to juniors in financial need who, in their first two years at Bucknell, have made significant contributions in scholarship, leadership, and in extracurricular activities.

The Richards Family Scholarship was established in 2000 by Daniel R. and Christine Peterjohn Richards '78/'76 in memory of Llewellyn Phillips, Class of 1892. Preference for awards from this scholarship shall be given to students with demonstrated financial need whose ethnic, racial, economic, geographic, cultural, or national origins add to the diversity of Bucknell.

The Danforth K. and Marjorie H. Richardson Scholarship was established in 1997 by Danforth K. Richardson, Class of 1942, and his wife, Marjorie Hopwood Richardson, Class of 1943, with gifts from the Richardson Foundation, Inc. The scholarship shall be awarded to students with demonstrated financial need, with first preference for students who reside in Florida, and second preference for students who reside in the Pittsburgh (Pa.) metropolitan area.

The John W. Richter III Scholarship was established by his parents, John W. Richter II and Linda A. Richter, to honor his memory. The scholarship shall be awarded to students with demonstrated financial need, with preference for students who are majoring in geology and without other restriction.

The Matthew Bunker Ridgway Jr. Scholarship was established by General and Mrs. Matthew B. Ridgway and friends in memory of their son, Class of 1971, the income to be used to provide financial aid for worthy undergraduate or graduate students selected by the University without any restrictions whatsoever.

The Mary Taubel Rieder Memorial Scholarship was established through an estate gift from Mary Taubel Rieder, Class of 1929. Preference for the scholarship award shall be given to needy and deserving students majoring in history.

The J. Paul Riesmeyer Scholarship was established in 2000 by Martha U. Grimm in memory of her husband, J. Paul Riesmeyer, Class of 1930. The scholarship shall be awarded to students with demonstrated financial need, with preference for students majoring in mechanical engineering.

The Jeanne B. Ritter Scholarship was established in her honor by her husband, Harry E. Ritter, Class of 1962, and their sons, Gary A. Ritter, Class of 1979, Keith B. Ritter, Class of 1982, and Robert L. Ritter, Class of 1992. The scholarship award shall be made without restriction to students with demonstrated financial need.

The Dean Rivenburg Scholarship Fund was established by a gift from Mr. and Mrs. Virgil L. Towner in honor of Romeyn H. Rivenburg, Dean of the College from 1923-45 and vice president of the University from 1936-145. The income is to be awarded to a worthy student in need who meets the standards of the University, with preference given to students from Ohio.

The Barbara Linsky Robbins Memorial Scholarship was established in 2003 by Richard K. Robbins, Class of 1970, to honor his mother. The scholarship shall be awarded to students with demonstrated financial need, with preference for students in the English department.

The Roberts Family Scholarship was established by W. Nelson Roberts and Jeane Morgenthal Roberts, both Class of 1947. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Dorothy E. Robertson Music Award was established by an estate gift from Miss Robertson, Class of 1931. Preference for the scholarship award will be given to a senior-year music student who intends to follow a career in music.

The Louis Robey Scholarship was established in 2003 by the estate of Louis Robey. The scholarship shall be awarded to worthy students attending Bucknell University.

The Jennie S. Robinson Scholarship was established by a bequest from Jennie S. Robinson, a former teacher in the schools of Milton, Pa., and augmented by a bequest from Max Lieberman, her nephew. This scholarship is awarded to a Bucknell student selected by the faculty of Milton High School.

The Mary E. and C. Graydon Rogers Scholarship was established by Mary E. and C. Graydon Rogers, both Class of 1951. The scholarship shall be awarded to students with demonstrated financial need with preference for students who major in the natural sciences and without other restriction.

The Steffen H. and Athena F. Rogers Scholarship was established in 2004 by David M. Trout Jr. and Leanne Freas Trout, both members of the Class of 1950. The scholarship honors Stef and Athena Rogers on the occasion of Stef Roger's retirement as Bucknell University's 15th president and commemorates their contribution to Bucknell during his administration.

The LeRoy H. and Edith Griesinger Rohde Memorial Scholarship was established by the family of LeRoy H. Rohde, Class of 1936, and Edith Griesinger Rohde, Class of 1937, to honor their memory. The scholarship award will be given to at least one junior and one senior each year, with preference given to students who demonstrate extracurricular leadership at Bucknell.

The Rudge Family Scholarship was established in 1999 by Howard J. Rudge, Class of 1958, and Lois Iffert Rudge, Class of 1959, and their children, Scott, Neal, and Diana, Class of 1989, so that other students might benefit from the excellent educational opportunities available at Bucknell University. Believing in and representing the wide spectrum of activities and fields of study offered at Bucknell, the Rudges desire that the scholarship be awarded to students with demonstrated financial need and without other restriction.

The Girard W. Rudolph Scholarship was established in 2000 by June Rudolph in memory of her late husband, Jerry Rudolph, Class of 1947. The scholarship shall be awarded to students with demonstrated financial need, with preference for students of high academic achievement majoring in music.

The Girard W. and June O. Rudolph Scholarship was established by Girard W. Rudolph, Class of 1947. The scholarship award will be made to students pursuing a degree in business administration.

The Rusling Family Scholarship was established by William E. Rusling in recognition of Ruth Castner Rusling, Class of 1952, Beverly Rusling Peltzer, Class of 1975, and Edward T. Peltzer, Class of 1972. The scholarship is awarded to students who have financial need and demonstrate gifts of leadership at Bucknell University.

The Campbell Rutledge Jr. Scholarship Fund was established by the Corning Glass Works Foundation and Eleanor Cauffiel Rutledge in memory of her husband's deep and abiding interest in Bucknell, his support of its engineering program, and his belief in young people. Mr. Rutledge was a graduate of the Class of 1933 and received a master's degree in chemical engineering in 1934. The scholarship is awarded annually, with preference given to an outstanding junior or senior engineering student upon recommendation of the Dean of the College of Engineering.

The Robert H. Sadler Memorial Scholarship was established in 2000 by friends and fraternity brothers of Robert Sadler '84. He earned a Ph.D. in microbiology/virology at the University of North Carolina (Chapel Hill). He did research in virology for the Howard Hughes Medical Institute at the University of California (San Francisco). Shortly before his untimely and tragic death he helped decipher the Byzantine genetic structure of the Kaposi's sarcoma virus. Preference for the scholarship award shall be given to students majoring in biology and without other restriction.

The Vernon H. Salmon Scholarship was established in 2000 by Vernon H. Salmon, Class of 1949. The scholarship shall be awarded to students with demonstrated financial need, with preference given to students from the state of New Jersey, and without other restriction.

The Samek Family Scholarship was established by Edward L. '58 and Marthann L. Samek '60. The scholarship shall be awarded to students with demonstrated financial need, and without other restriction.

The Sampson Family Scholarship was established in 1992 by Benard A. Sampson, Class of 1969, and Myles D. Sampson, Class of 1967. The scholarship award shall be made without restriction.

The George F. Sandel '32 Memorial Scholarship was established in 2002 by his family, including Elizabeth Sandel, Class of 1971, and Carolyn Sandel Anderson. The scholarship

shall be awarded to students with demonstrated financial need, with preference for students majoring in education or planning a career in education.

The Britt and Janet Saterlee Scholarship was established in 2000 with a gift by Britton W. '44 and Janet Saterlee. The scholarship award shall be made without restriction.

The Stephanie A. Sayre Scholarship was established to honor the memory of Stephanie A. Sayre, Class of 1991, by her parents, George W. and Mary Ann T. Sayre, and augmented by family and friends. As an acknowledgement of her love for the theatre, preference for the scholarship award shall be given to a student displaying special talent in the performing arts, preferably theatre, and who, without financial assistance, would be unable to attend the University.

The Leonhardt and Elizabeth Scheffler Scholarship was established by Leonhardt Scheffler (Class of 1935) and his wife, Elizabeth Bentley Scheffler (M.A. 1935). The scholarship shall be awarded to students with demonstrated financial need, with preference for a junior or senior student.

The Dorothy Bunnell Schnure Scholarship was established by gifts from Dorothy Bunnell Schnure, Class of 1916, and additional contributions from family and friends. Awards from the fund will be made to students with demonstrated financial need who meet the standards of the University, and without other restrictions.

The Frederick O. and Elise Miller Schnure Scholarship was established by Frederick O. Schnure Jr., Class of 1942, and Elise Miller Schnure, Class of 1945. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Robert Bunnell and Annabel Kreider Schnure Scholarship was established by Robert B. '40 and Annabel K. Schnure '40. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The John F. Schrankel Scholarship was established by John F. Schrankel, Esq., Class of 1951. Preference for the scholarship award shall be given to students studying political science or history who demonstrate financial need and academic achievement.

The Schubauer Family Scholarship was established in 2000 by James W. Schubauer, Class of 1956, and his wife, Barbara. Grants from the scholarship will be made to middle income engineering students who are United States citizens.

The Schulte Family Athletic Scholarship was established by Frederick A. Schulte Jr. and Carol E. Schulte, parents of Scott F. Schulte '81. Preference for awards from this scholarship shall be given to talented scholar-athletes with demonstrated financial need who are members of the varsity water polo or swimming teams.

The John D. Scoutten Memorial Scholarship was established by a gift from the family and friends of John D. Scoutten, Class of 1970, the income to be used by any qualified applicant who, without such financial assistance, would not be able to attend the University. Preference is to be given to graduates of Culver Military Academy.

The Sandra Selby Scholarship was established by Sandra F. Selby, Class of 1974. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Germaine Roshon Seltzer Scholarship was established through a bequest from William O. Seltzer, in memory of his wife, Germaine Roshon Seltzer, Class of 1942. First preference for the scholarship award will be given to undergraduate students majoring in the biological sciences or in premedical or prenursing studies.

The Seltzer Family Scholarship was established in memory of Ethel M. Seltzer, Class of 1942. Preference for the scholarship award shall be given to students majoring in management with a concentration in marketing, or in accounting.

The Shand Family Scholarship was established by J. Richard and Gail Rothenberger Shand, both Class of 1955, and their children, J. Richard Shand Jr. '81, David A. Shand '87 and Barbara Shand Neff '90. The scholarship shall be awarded to students who are United States citizens with demonstrated financial need, with preference given to students who are majoring in engineering, physical sciences, or mathematics.

The Marie M. and Fred S. Shehadi Sr. Family Scholarship was established in 2001 by their son, Fred Jr., Class of 1954, and their Bucknell grandchildren: David, Class of 1981, John, Class of 1984, and Lauren Herbert, Class of 1991. The scholarship shall be awarded to students with demonstrated financial need, with preference given to student athletes.

The William and Ann Sharp Scholarship was established in 2000 by William H. Sharp Jr. and Ann Hardy Sharp, both members of the Class of 1959. The scholarship shall be awarded to students with demonstrated financial need.

The Shaw Family Scholarship was established by Donald M. and Marguerite M. Shaw, and their son, Andrew M. Shaw, Class of 1991. The scholarship award shall be made without restriction.

The Juan del Castillo and Susan G. Shipe Scholarship was established with a gift completed in 2007 by Juan del Castillo and Susan G. Shipe. The scholarship shall be awarded to students with demonstrated financial need, and without other restriction.

The Mary Reese Shorts and Arthur Mead Shorts Scholarship was established in 2006 by Mary Reese Shorts, Class of 1932, to honor the time she and her husband, Arthur, Class of 1930, spent at Bucknell. The scholarship award shall be made without restriction.

The John H. Shott Memorial Bison Club Scholarship Fund is to be awarded annually to deserving students who are of good character and who need financial assistance, with preference to be given to those with athletic ability.

The William C. and Ruth W. Shure Memorial Scholarship was established in 2005 by an estate gift from Ruth W. Shure, Class of 1930, to commemorate the friendships and education acquired during the years of student and alumni relationships to Bucknell. Because of the wide ranging interests of both Ruth and William Shure (Class of 1930), the scholarship was established to aid needy students without other restriction.

The Blanche Thomas Simpson and Geddes Wilson Simpson Scholarship was established by Blanche Simpson Bast, Class of 1961, Geddes W. Simpson Jr., Class of 1967, Frank T. Simpson, and Mary Simpson Sunar, in honor of their parents, Blanche, Class of 1930, and Geddes, Class of 1929. The scholarship shall be awarded to students with demonstrated financial need, with preference for students majoring in math or the sciences, and without other restriction.

The Frank M. Simpson Scholarship was established in 2000 by Dr. Geddes W. Simpson, Class of 1929, in memory of his father, Frank M. Simpson, Class of 1885, who was a professor of physics at Bucknell from 1902 until 1942. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Michael F. Sinkus Scholarship was established by Michael F. Sinkus Jr. The scholarship award will be made without restriction.

The Dick Skelton Scholarship was established in 2000 by friends and trustees of Bucknell at the time of Dick's retirement to honor his more than 36 years as an admissions officer at Bucknell. Preference for the scholarship award is to be given to students from Wayne, Pike or Monroe counties in Pennsylvania, who demonstrate financial need.

The Kenneth W. Slifer Scholarship was established in 2001 to honor the memory of Ken Slifer, Class of 1926, by one of the many young men he encouraged and helped to attend Bucknell, thereby changing his life. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Paul Wilbur Slifer Scholarship was established by a bequest of Adam Conrad Slifer in memory of his son, for a deserving and needy student.

The Smalstig Memorial Scholarship was established by family, friends, and classmates in memory of Edward J. and Alice Drennen Smalstig '31/'31. The scholarship shall be awarded to deserving students in either the College of Engineering (with preference given to civil engineering students) or the College of Arts and Sciences (with preference given to biology majors), in order to encourage and enable them to study abroad.

The Marjorie Bell Smith Scholarship was established by I. R. Smith, M.D., in memory of his wife, Class of 1928, to be awarded to students who meet the University's academic standards, the preference to be given to majors in English.

The Lloyd and Myrna Smith Scholarship was established by Robert M. Brodrick, Class of 1961, in memory of his maternal grandparents. Preference for the scholarship award shall be given to engineering students.

The Harry E. Smithgall Scholarship was established by Harry E. Smithgall, Class of 1936. The scholarship shall be awarded to students majoring in electrical engineering, with preference to students who reside in Lycoming County, Pa.

The Bonnie Shihadeh Smithwick Memorial Scholarship was established in 2003 by members of the Class of 1968 at the time of their 35th Reunion. The scholarship is named in memory of Bonnie Shihadeh Smithwick, who was lost to us on September 11, 2001, but it is also intended to honor the memory of other classmates who have left us too soon. The scholarship shall be awarded to a deserving undergraduate student or students with demonstrated financial need.

The Ralph R. Snow Scholarship was established by Ralph R. Snow, A.M., B.D., Class of 1894, for graduates of the Franklin High School, Pa.

The Harold M. Soars Scholarship was established by gifts of the Sprout Waldron Foundation and of Harold M. Soars, former chairman of the Sprout Waldron Company and a trustee of the University. The income from the fund is to be used to provide financial assistance to a student pursuing a degree at Bucknell, with preference given to students from Lycoming County, Pa., and from the counties contiguous to it, who are pursuing a degree in engineering.

The Margaret G. Sober '34 Memorial Scholarship was established in 2002 by her sister, Annabelle F. Sober. The scholarship shall be awarded to students with demonstrated financial need, with preference for English majors.

The Dirk A. Sojka Scholarship was established by a gift from Helen R. Smith in honor of her grandson. It is to be awarded to master's students with an interest in special education who are enrolled in the graduate program for school psychology.

The Gary and Sandy Sojka Scholarship was established in 1995 by the Bucknell University Alumni Association to honor Gary and Sandy Sojka on the occasion of Gary Sojka's retirement as Bucknell University's 13th president, and to commemorate their contribution to Bucknell during his administration. In keeping with the Sojkas' longstanding, broad, and all-inclusive interest in Bucknell students, awards from this fund shall be made to students with demonstrated financial need and without other restriction.

The Sommers Family Scholarship was established by John and Catherine Sommers, Class of 1961. Preference for awards from this scholarship shall be given to talented scholar-athletes with demonstrated financial need, recommended by the director of athletics and the coaches.

The Speer Family Scholarship was established by Edison C. and Nancy B. Speer '57/'56. The scholarship shall be awarded to students with demonstrated financial need, with preference for students from western Pennsylvania and without other restriction.

The Herbert L. Spencer Scholarship was established by the Spencer family in memory of Bucknell's eighth president. The scholarship award will be made without restriction.

The Sally L. Spencer Scholarship was established through gifts from the Spencer family, and is named for Sally L. Spencer, Class of 1953. Preference for the scholarship award shall be given to needy and deserving students whose character, ethics, and commitment to serving others represents the best in human nature.

The Jessie Lovell Sprague Music Scholarship Fund was established by Jessie Lovell Sprague, Class of 1902, the income to be used for a deserving woman student studying voice and with wholesome interest in her fellow students.

The Harry E. Stabler Athletic Scholarship was established by an estate gift from Harry E. Stabler, Class of 1923. Preference for the scholarship award shall be given to student-athletes from Broome County, N.Y. It is the donor's preference that, if possible, first preference be given to football players and second preference to basketball players. If no students from Broome County qualify, then the scholarship shall be awarded to a student-athlete from another area.

The Stackpole-Hall Foundation Scholarship was established in 1973 for a needy and disadvantaged student majoring in business or engineering.

The Dominick and Martha Staiano Scholarship was established by Edward F. Staiano, Class of 1958, to honor the memory of his parents. Grants from the scholarship will be made under the direction of the dean of the College of Engineering and used to recruit and retain the best possible undergraduate students from the College of Engineering. The scholarship shall be awarded to students without other restriction.

The Mary Stanton Scholarship Fund was established by John W. Speicher in honor of his wife, and is to be awarded to a deserving student in the upper third of his/her class.

The Emily Jane Stec Memorial Scholarship was established in 2000 by her parents, Arlene Nemeth Stec, Class of 1949, and Edward J. Stec, Class of 1950. The scholarship shall be awarded to students with demonstrated financial need, with preference for students gifted in the field of dramatic arts who elect the study of theatre as an academic major or minor.

The Alice Stevens Scholarship was established in 2005 by Alice L. '45 and Mike Volechenisky. Preference shall be given to students majoring in physics or chemistry.

The Austin and Anna Thompson Stevens Scholarship was established by Alden S. Thompson, Class of 1937. Preference for the scholarship award will be given to those with an interest or major in journalism or literature.

The Stewart Family Scholarship was established by Richard W., Class of 1966, and Grace H. Stewart. The scholarship shall be awarded to students with demonstrated financial need, with preference for students who have graduated from Springfield Township High School, Montgomery County, Pa.

The Harold A. Stewart Scholarship was established by Mr. Stewart, Class of 1920 and emeritus trustee. Preference for the scholarship award will be given to students from western Pennsylvania, especially Westmoreland County.

The Charles F. Stickney Scholarship was established by Dorothy Turnbach Stickney, Class of 1949, in memory of her husband, Class of 1948, and professor of physics emeritus. Preference for the scholarship award will be given to students majoring in physics or music.

The Harold R. and Jacqueline S. Stiefel Memorial Scholarship was established in 1993 by family, friends, and members of the Sigma Alpha Mu fraternity, in memory of Harold R. Stiefel, Class of 1949, and his wife, Jacquie. The Stiefels were long-time owners of the Lewisburg Campus Theatre, enthusiastic fans of Bucknell basketball, and beloved members of the Bucknell community. Preference for the scholarship award shall be given to members of the Bucknell basketball team who have demonstrated financial need.

The George and Mary Gibb Strachan Memorial Scholarship was established in 2000 by Robert G. and Patricia Wenk Strachan '58/'57, and their daughter, Ellen Strachan Wilsterman '85. The scholarship shall be awarded to students with demonstrated financial need, and without other restriction.

The Franklin R. Strayer Scholarships, five in number, were established by a bequest of Franklin R. Strayer, Class of 1894, in memory of his professors: William Cyrus Bartol, George G. Groff, John Howard Harris, William Gundy Owens, and Frank Ernest Rockwood.

The Strickland Family Scholarship was established in 2001 by Frank W. Strickland, Class of 1946 and a former Bucknell University Alumni Trustee, and Eleanor Dillon Strickland, Class of 1946. The scholarship shall be awarded to students with demonstrated financial

need, with first preference to descendants of Frank W. Strickland and Eleanor Dillon Strickland and then to qualified students who are graduated from high schools in Bergen County, N.J., or Bucks County, Pa.

The Dorothy M. and Edward H. Stubenrauch Scholarship was established in 2000 by Dorothy M. Stubenrauch, past parent. The scholarship shall be awarded to students with demonstrated financial need, with preference for students majoring in engineering and without other restriction.

The Student-Faculty Congress Scholarships were established in 1965 for two or more needy students of the senior class who are in good academic standing and have given commendable service to the University.

The Phoebe A. Suyden Scholarship was established by a bequest of Mrs. Suyden, the income to be awarded to a deserving student.

The Lester A. and Miriam M. Switzer Memorial Scholarship Fund was established by a bequest of Mrs. Switzer, the income to be used as a scholarship for a deserving student.

The Tague Family Scholarship was established by Barry E. Tague, Class of 1960, and his wife, Dorothy Tague. Preference for the scholarship award shall be given to students from the greater Philadelphia area, with demonstrated financial need, whose ethnic, racial, economic or national origins add to the diversity of Bucknell.

The Dr. Roy C. Tasker Scholarship was established by his daughter, Lois Anne Tasker, and supplemented with gifts by friends and former students to honor the memory of Dr. Roy Carleton Tasker, who taught biology at Bucknell from 1934-66. Preference for the scholarship award shall be given to students majoring in biology, with first preference given to premed students.

The Marianne E. Szoo Teleky Memorial Scholarship was established with a gift from her daughter, Priscilla M. Teleky, Class of 1961, and Paul W. Davis, Cornell University, Class of 1952 and 1959. Preference for the scholarship award shall be given to students with visual impairments pursuing degrees in mathematics, engineering, or economics; however, other disciplines are not disqualified. Given "in lasting memory of my beloved Mother, Marianne E. Szoo Teleky, born in Hungary, whose wisdom, courage, and loving sacrifice wove the fabric of my comfortable and meaningful life. With this Memorial Scholarship, Mother's honorable, unselfish spirit and constructive energies will forever serve worthy students, and Mother's memory will endure."

The Theta Chi Alumni Association Scholarship was established in 1968 for a member of the Theta Chi fraternity.

The Stanley C. Thomas Scholarship was established in memory of Mr. Thomas, Class of 1938 (M.A. 1946), by Geddes W. Simpson Jr., Class of 1967, and other family members.

The Hamilton O. and Lillian Somers Thompson Scholarship was established by Hamilton O. Thompson, Class of 1939, in memory of his wife, Class of 1938. The scholarship award will be made without restriction.

The Joan Groulx Thompson Scholarship was established by Dr. Alden S. Thompson, Class of 1937, and his family to preserve the memory of Joan G. Thompson, Class of 1949. Preference for the award shall be given to students of the biological sciences.

The William Homer Thompson Scholarship was established by William Homer Thompson, a former trustee of Bucknell University, with preference to be given to a graduate of The Peddie School or of the Hightstown High School, N.J.

The Freeman T. and Anna L. Tingley Scholarship was established by an estate gift from Anna L. Tingley in memory of her husband, a member of the Class of 1922. The scholarship award shall be made without restriction.

The Robin Sundy Tingue Memorial Dance Scholarship was established in 2006 to honor and preserve the memory of this member of the Class of 1987 by her husband, David Tingue. The scholarship shall be awarded to students with demonstrated financial need, and to commemorate Robin's active participation as a dancer at Bucknell, with preference for students engaged in the dance program, either as declared majors or as active and regular participants in the study and performance of dance.

The Edgar A. and Florence E. Tomlinson Scholarship was established by Edgar A. Tomlinson, Class of 1939. The scholarship award shall be made without restriction.

The Harland A. Trax Scholarship was established by a gift from Harland A. Trax, A.M., LL.D., Class of 1901.

The Paul L. and Eleanor M. Troast Scholarship was established in memory of Paul L. Troast, a trustee of the University from 1949-69, by gifts from a family foundation and through the efforts of his sons, Arthur L. Troast, Class of 1950, and John G. Troast, Class of 1953, and his grandsons, John G. Troast Jr., Class of 1979, Arthur P. Troast, Class of 1983, Douglas K. Troast, Class of 1985, and Gary S. Troast, Class of 1987. Preference for the scholarship award shall be given to students from New Jersey who demonstrate excellence in the fields of engineering or business studies.

The David and Leanne Trout Scholarship was established by Federal Paper Board Company, Inc., to honor David M. Trout Jr., a Bucknell trustee and member of Bucknell's Class of 1950, on the occasion of his retirement from the company. The scholarship award is unrestricted.

The Trout Family Scholarship was established by David M. Trout, Class of 1950, and his wife, R. Leanne Freas Trout, Class of 1950. First preference for the scholarship award shall be given to graduates of Branford (Conn.) High School, and second preference to students who are residents of Connecticut.

The Trout Family Arts Scholarship was established in 2003 by David M. and Leanne Freas Trout Jr., both members of the Class of 1950. Grants from the scholarship will be awarded to academically superior students of art and art history.

The Doris Tucker Memorial Scholarship was established to honor the memory of Doris Tucker, by her husband, Stuart Tucker, and her son, Scott J. Lawlor, Class of 1986. Preference for the scholarship award will be given to students interested in the performing arts, especially dance.

The Margaret Young Underhill Scholarship was established in 1998 by the family and friends of Margaret Young Underhill, Class of 1933, to honor her memory. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Lee N. and Grace Q. Vedder Foundation Scholarship was established in honor of Professor Paul Benson, the income to be used for a student in the field of mathematical and applied statistics.

The Elizabeth Veit Scholarships were established by a bequest of Elizabeth Veit for young men who are preparing to enter the ministry of the Baptist Church.

The Charles I. and Virginia Vogel Scholarship was established by Charles I. and Virginia Vogel '37/'40. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The Charles A. and Catherine M. Vosburg Memorial Scholarship was established by gifts from Charles M. Vosburg (B.S. '58), in memory of his parents. Preference for the scholarship award will be given to R.O.T.C. cadets who are candidates for the B.S. degree and who have declared majors in the physical sciences or engineering, and who are United States citizens.

The Walker Family Scholarship was established by Ray S. and Louise S. Walker. The scholarship award will be given to graduates of high schools in Clearfield County, Pa. It is the intent of the donors that the scholarship recipient(s) shall endeavor to enhance the economic and cultural well-being of the areas served by the eligible high schools.

The Doug and Inta Walker Scholarship was established in 1998 by Douglas and Inta Esmanis Walker, both Class of 1966. The scholarship shall be awarded to students with demonstrated financial need, who are majoring in engineering and whose life experiences contribute to the cultural and intellectual climate of the campus, including first-generation college students, students from outside the University's traditional geographic area, and those who bring cultural and intellectual diversity to the campus.

The Anna M. Wall Scholarships were established by Anna M. Wall, with preference given to women.

The Anna Slifer Walls Scholarship was established by William C. Walls, Class of 1873, in memory of his wife, Institute Class of 1872, for a student who is majoring in history or literature and who lives in Union County or in a designated portion of Northumberland County.

The Anna Slifer Walls Memorial Scholarship in Biology was established by heirs named in the E. Slifer Walls estate, to be made available first to students from Union County, then central Pennsylvania, and finally to students from any other area.

The Anna Slifer Walls Memorial Fellowship in Biological Research was established by heirs named in the E. Slifer Walls estate, to be made available first to students from Union County, then central Pennsylvania, and finally to students from any other area.

The Dr. E. Slifer Walls Scholarship was established by William C. Walls in memory of his son, Class of 1903, for a student who is majoring in a premedical or a public health course and who lives in Union County or in a designated portion of Northumberland County.

The Dorothy Moody Warren Scholarship Fund was established by Mrs. Warren, an alumna, to provide three scholarships each year, with preference to be given to full-time, needy students who are graduates of Shamokin Area High School, Pa., or Bridgeton High School, N.J.

The P. Herbert Watson Memorial Scholarship was established by his wife, Dorothea B. Watson, and friends, to honor the memory of her husband, Class of 1937. Preference for the award will be given to music majors as acknowledgement of his love for music.

The Dr. and Mrs. Joseph Weaver Scholarships were established by a gift from Colonel Joseph Kerr Weaver, Class of 1861, and were named by action of the Board of Trustees in honor of Doctor and Mrs. Joseph K. Weaver.

The Harold F. and Marguerite P. Webber Memorial Scholarship was established by family and friends. The income is to be used to aid worthy and needy students who otherwise could not afford a college education. Preference shall be given to civil engineering, music, or management majors.

The Rev. Dr. John Weaver and Eleanor Grose Weddell Scholarship was established by Arthur L. (AM '27, H '74) and Margaret Weddell Brandon (AB '16, AM '31) to honor the memory of the Weddells. Preference for the award shall be given to students of the liberal arts contemplating a career teaching English or a life involved with religion, without regard for their specific creed or denomination.

The Sigmund and Claire G. Weis Scholarship was established by Claire G. Weis, the income from which is to be awarded annually to one or more students in the department of management.

The Patricia Woodburne Wells Scholarship was established by Ronald V. Wells, Honorary Doctor of Divinity 1968, and Patricia Woodburne Wells, Class of 1935. The scholarship shall be awarded to students with demonstrated financial need, and without other restriction.

The Peter C. Welpton Scholarship was established in his memory by his family, members of his Class of 1965, and friends, the income to be used for a worthy student majoring in economics.

The Claire Halline Wieder Scholarship was established in her memory by members of her Class of 1958, and friends, the income to be used for a deserving woman student.

The Frank L. Wiegand III, Class of 1960, and his daughter Maryanne Wiegand, Class of 1983 Scholarship was established in 2000 by Frank L. Wiegand III and Maryanne Wiegand. The scholarship shall be awarded to undergraduates with demonstrated financial need who are U.S. citizens, with preference given to students who are the children of Bucknell alumni.

The Doris K. Williams Scholarship was established by Stanley G. Williams, Class of 1943, in honor of his wife. Preference for the scholarship award shall be given to students majoring in computer science.

The Lee A. and Annis Williams Scholarship was established by Stanley G. Williams, Class of 1943, and his wife, Doris K. Williams, in memory of his parents. The scholarship award will be made without restriction.

The Norman Lee Williams Scholarship was established by Stanley G. Williams, Class of 1943, in honor of his brother. Preference for the scholarship award shall be given to students majoring in computer science.

The Robert M. and Virginia K. Williams Scholarship was established by Robert M., Class of 1962, and Virginia K., Class of 1963, Williams. Preference for the scholarship award shall be given to students majoring in education, with demonstrated financial need.

The Ruth Williams Scholarship was established in 2004 by Jo-Anne Williams, Class of 1986, in memory of her mother. The scholarship shall be awarded to students with demonstrated financial need and without other restriction.

The T. Cortlandt and Evelyn D. Williams Scholarship Fund for Engineering Students is awarded to a student who has completed the first two years at Bucknell or a junior college, and who, in the opinion of the dean of the College of Engineering, shows outstanding interest in and aptitude for the engineering profession.

The William V. Wilson Scholarship was established in memory of The Reverend William V. Wilson, D.D., of New Jersey.

The U Kyaw Win and Gandasari A. Win Scholarship was established in 2000 by U Kyaw Win and Gandasari A. Win. The scholarship is intended to benefit the nation and people of Burma, by providing grants for current or future Burmese citizens who are students at Bucknell, and who have demonstrated financial need.

The Wingover Farm Scholarship was established in 2004 by William T. '45 and Gladys B. Watkinson. Awards from this scholarship shall be made without restriction.

The Florence E. Wolfe Memorial Scholarship was established by her son, Bucknell's former vice president for University relations, Charles W. Wolfe, to honor his mother's memory by assisting qualified students through the general scholarship funds of the University.

The Oscar Wolfe Engineering Scholarship was established in 2001 through a bequest from Anton O. Wolfe, Class of 1939, in memory of his father, Oscar Wolfe, Class of 1912. The scholarship shall be awarded to students with demonstrated financial need who are enrolled in the College of Engineering.

The Wynee Wong Memorial Scholarship was established in 2005 by her mother, Ellen C. Wong, and her family and by friends. The scholarship fund honors the memory of this 2004 graduate of Bucknell, by continuing the financial aid Wynee received as a Bucknell student. The scholarship shall be awarded to students with demonstrated financial need, and without other restriction.

The Thomas '05 and Blanche Stoner Wood '05 and son, 2nd Lt. James Wood '43, Scholarship was established in 1999 by members of the Wood family. The scholarship shall be awarded to students with demonstrated financial need, with preference for students who have achieved academic excellence in high school.

The Robert B. Woolhouse Scholarship was established in 2000 under a deferred gift plan funded by Robert B. Woolhouse, Class of 1951. The scholarship shall be awarded to students with demonstrated financial need.

The William W. and Myrtle E. Woolhouse Scholarship was established in memory of his parents, under a deferred gift plan funded in 2000 by Robert B. Woolhouse, Class of 1951. The scholarship shall be awarded to students with demonstrated financial need.

The Audley C. Wynkoop Scholarship was established by Claire Wynkoop Carlson, Class of 1949, in memory of her father, the income to be used for a deserving engineering student chosen by the dean of the College of Engineering, acting upon the recommendations of the Bucknell University Scholarship Committee.

The Paul M. Wythes Jr. Class of 1990 Scholarship was established in 1990 in his honor by his parents, Mr. and Mrs. Paul M. Wythes. The scholarship award will be made annually without restriction to financially deserving undergraduates.

The M. David Yamamoto Scholarship was established in memory of David Yamamoto, M.A. 1957, by his wife, T. Atsuko Yamamoto, M.A. 1956, and friends. Awards from this fund will be made available to students with demonstrated financial need enrolled in the Japanese studies program.

The Zafirovski Family Scholarship was established in 2004 by Robin Gale Zafirovski, Class of 1979, and Mike Zafirovski. The scholarship shall be awarded to students with demonstrated financial need, with preference for incoming first-year students who have participated in varsity athletics and have demonstrated outstanding leadership and involvement in their high schools and communities.

The Zaharchuk Family Scholarship was established in 2001 by John J. and Susan Haines Zaharchuk, both members of the Class of 1981. The scholarship shall be awarded to students with demonstrated financial need with preference given to students from southeastern Pennsylvania.

The Herman E. and Gertrude J. Zehner Memorial Scholarship was established by Betty J. Zehner, in memory of her father, Class of 1913, and her mother. Preference for the scholarship award will be given to students majoring in chemical engineering or chemistry, who participate in athletics on the varsity, club, intramural, or recreational level, and are in good academic standing.

The John F. and Martha H. Zeller Scholarship was established in 2005 by the Charles B. Degenstein Foundation and its officers. The scholarship honors John F. Zeller III, a member of Bucknell's Class of 1941, acting president and long-time senior administrator and general counsel for Bucknell University, and his wife, Martha H. Zeller, a valued member of the Bucknell family. The scholarship shall be awarded to students without restriction.

The Susan Penecale Zolla Scholarship was established in 2000 by Susan P. Zolla, Class of 1968, and her husband, Edward M. Zolla. The scholarship shall be awarded to students with demonstrated financial need, with preference going to students from the West Coast who graduated from a public high school.

Loan Funds

The Alumni Loyalty Loan Fund was established by gifts from alumni and friends. The principal of this fund is to be loaned to worthy students of the University.

The Roy Grier Bostwick Student Assistance Fund was established by a bequest from the estate of Mrs. Roy G. Bostwick, the income to be used as loans to deserving young men and women.

The Koppers Company Loan Fund was established by the Koppers Company, with preference to be given to students who are majoring in chemistry or in chemical, civil, electrical, or mechanical engineering.

The Marjorie E. and Lucille Mosher Memorial Loan Fund was established through a bequest by Marjorie E. Mosher, Class of 1942, the income of which provides loans to female undergraduate students majoring in the fields of English or chemistry.

Student Research Funds

The Michael Baker Jr. Inc. Fund for Undergraduate Research in Civil and Environmental Engineering was established in 2000. The research stipends shall be awarded to undergraduate students conducting research in civil and environmental engineering, with preference given to students studying transportation systems.

The David Burpee Plant Genetics Fund was established in 1975 by David Burpee, a member of Bucknell's Board of Trustees, to provide summer research scholarships to encourage and prepare promising undergraduate students for advanced graduate studies and careers in plant genetics.

The Douglas K. Candland Undergraduate Research Fund was established in 1997 by Glen E. Tullman, Class of 1981, and his wife, Trish, to honor Professor Candland's years of service as teacher, scholar and mentor. The fund is designed to encourage imagination, innovation and the development of problem-solving skills among students majoring in the humanities and social sciences.

The Chemistry Graduate Research Fund was established under an agreement completed in 2000. Stipends from the fund shall be awarded as fellowships to MS graduate students conducting research in the department of chemistry. Research fellows will be selected by the then chair of the department of chemistry, upon recommendation by faculty members directing the research of the fellows.

The Stephen Glenn Hobar Memorial Research Award was established by Mr. and Mrs. Stephen Hobar and sons Donald, Jon, Robert, and James in memory of their son and brother, Glenn, Class of 1975, who lost his life while wilderness back-packing. The award is to go to a student of chemistry who has completed the sophomore year to provide the student with an opportunity to do summer research with the intent of clarifying whether or not chemical research is the proper academic field for the recipient. The recipient will be selected by the chemistry department.

The John M. Hustler Undergraduate Research Fund was established in 2002 by John M. Hustler, Class of 1941. The research stipends shall be awarded to undergraduate students majoring in chemistry.

The Kales Undergraduate Research Fund was established in 1984 by Dr. Anthony Kales and his wife, Dr. Joyce D. Kales, in recognition that student participation in independent undergraduate research is crucial for developing their ability to perform at the highest level as medical or other graduate students. The fund will provide support for research and publication opportunities for Bucknell students, particularly those working under the supervision of faculty members in the biology and chemistry departments.

The Kalman Fund for Biomedical Education was established in 1999 by Ernest M. Kalman, Class of 1956, and his wife, Joan, in recognition of the benefits which accrue to all people through advances in medical science. The fund makes possible faculty-mentored summer research through its Fellows Program, helps acquire and maintain equipment and instrumentation required in the study of the life sciences, and supports off-campus learning opportunities for exceptional Bucknell students. The fund is designed to support the work of undergraduates who plan to pursue post-graduate education, and through the support of activities that might not otherwise be available, to enhance students' chances for acceptance into premier medical and graduate schools.

The Kalman Fund for Undergraduate Research in the Sciences was established in 1999 by Ernest M. Kalman '56 and his wife, Joan, in recognition of the benefits which accrue to all people through advances in the sciences. The fund makes possible faculty-mentored research projects in the sciences for exceptional Bucknell students.

The Wayne E. and Margaret S. Manning Internship in the Botanical Sciences was established through a bequest from Wayne E. Manning, professor emeritus of botany and member of Bucknell's faculty from 1945-68, and his wife, Peg, who provided years of service to the collection. Awards from this fund shall be used for students engaged in summer research programs in the department of biology in order to encourage and prepare promising students for advanced graduate studies and careers in the botanical sciences.

The Meerwarth Sociology and Anthropology Research Fund was established in 2001 by Tracy L. Meerwarth, Class of 1996, and her mother, Lurenna M. Meerwarth. The fund supports research conducted by undergraduate students and presentation by students of the findings of their research, under the guidance of faculty of the department of sociology and anthropology. The fund's goal is to advance students' understanding of the work of anthropology and sociology by actively involving them in research.

The PPL Utilities Undergraduate Research Fund was established by PPL Utilities in 1997. The research stipends shall be awarded to undergraduate students majoring in electrical engineering or management.

The Juliet Shield-Taylor Fund for Undergraduate Research was established in 2003. First preference for research stipends shall be given to undergraduate students undertaking summer projects in the performing arts. Secondary preference shall be given to projects in the visual arts.

The Wendell I. Smith Internships in Psychology were established by gifts from former students, friends, and colleagues of Provost Smith, Class of 1946, who, as a member of the Bucknell faculty from 1946-86, served his academic discipline and his alma mater with distinction. The internships, awarded to students who show promise of doing distinguished work in the profession, provide opportunities to work with faculty members as teaching and/or research assistants in a program administered by the head of the department.

The Thomas R. Spitzer Undergraduate Research Fund was established in 1999 by Thomas R. Spitzer, Class of 1970. The research stipends shall be awarded to undergraduate students majoring in any academic discipline, who wish to participate in a medically related research position in an off-campus environment.

The Tague Family Fund for Undergraduate Research in Biomedical, Biological, and Biochemical Sciences was established in 2000. The research stipends shall be awarded to undergraduate students conducting research in studies concerning breast cancer.

The Fund for Undergraduate Research in Biological and Chemical Sciences was established in 1999. The research stipends shall be awarded to undergraduate students majoring in any biological or chemical science. Research fellows are selected by competitive application.

The Robert P. Vidinghoff Memorial Summer Internship was established by Raymond A. and Virginia Vidinghoff, to preserve the memory of their son, Robert, Class of 1969. Awards from the fund will be used for students engaged in summer research programs administered by the science departments at Bucknell.

Additional Funds

The Alumni Association Board of Directors Endowment was established in 2004 by the board of directors of the Alumni Association of Bucknell University and Bucknell University. Income from the fund shall be used to support the mission of the Alumni Association, "to be an active and effective advocate for alumni in order to promote and enhance Bucknell."

The Arias Family Bucknell Public Interest Program (BPIP) Internship Fund was established in 2005 by Louise and Robert Arias, parents of Andrew Arias, Class of 1999. The fund shall support internship opportunities through the Bucknell Public Interest Program.

The Beavers Internship was established by Thomas Gessner and the trustees of the Beavers Charitable Trust. The income from the fund will be used to support the civil engineering faculty in taking students to visit various construction projects during the spring semester of their junior year.

The Milton and Eleanor Berelson Judaica Collection Endowment was established in 1988 by Stuart E. Berelson, Class of 1959, and others, to honor the lives and commitment to education of his parents. Income from the endowment may be used to acquire books and other library materials in the field of Jewish studies, to increase awareness of the contributions of the Jewish experience and enhance the appeal of Bucknell to students of the Jewish faith, and to support programs and activities that promote the use of the collection.

The Ellen Clarke Bertrand Library Fund was established with a bequest from the estate of Ellen Clarke Bertrand. The income derived from this fund is used to support the acquisitions, operations and maintenance of the library and its provision of services and materials to Bucknell's academic community.

The Lauren P. Breakiron Technology and Management Fund was established by Lauren P. Breakiron, Class of 1952. Income from the fund shall be used to support interdisciplinary programs or activities which integrate engineering and management education in ways that provide a more holistic perspective on complex corporate problems involving technology.

The Gladys Brooks Special Collections Library Endowment was established for the acquisition of books and periodicals in support of special new curricular programs or newly emerging areas of faculty interest.

The F. W. "Bill" Carson '42 and Betty Thomas Carson '42 Tennis Endowment was established in 2000 by Betty Carson '42 and Bill Carson '42, a member and two-time captain of Bucknell's varsity tennis team. The fund shall be used to support the men's and women's varsity tennis teams.

The F. Michael Corrigan Men's Basketball Endowment was established under an agreement completed in 2006 by F. Michael Corrigan, Class of 1957. The fund supports Bucknell's intercollegiate men's basketball team coaches, and is intended to help the team compete successfully at the highest level.

The Martha Sober Davis '45 Memorial Management Fund was established in 2007 by her brother, Charles T. Sober, Class of 1939, to honor her memory. The fund supports management education at the highest possible level by aiding the students, faculty and programs of the department of management.

The William A. Graham IV Women's Varsity Athletics Endowment was established in 2004 by William A. Graham IV, Class of 1962. The fund is intended to support equitable opportunities for all coaches and athletes participating in University women's varsity athletic programs, regardless of chosen sport.

The William A. Graham IV Wrestling Endowment was established in 2004 by William A. Graham IV, Class of 1962. The fund supports Bucknell's intercollegiate wrestling program and is intended to enable it to compete successfully at the highest possible level.

The Frederic and Linda Greenberg Fund for Jewish Life and Learning was established in 2000 by Linda Garrett Greenberg, Class of 1963, and her husband, Frederic Greenberg. The fund shall be used to nurture the life of the Jewish community at Bucknell and to deepen the understanding of Jewish thought, history and traditions among students of all faiths.

The Art Gulden Cross Country and Track and Field Endowment was established in 2002 by alumni and supporters of the cross country and track and field programs in honor of Coach Art Gulden on his 30th anniversary at Bucknell. Coach Gulden touched the lives of many of Bucknell's finest athletes as head coach of the cross country and track and field programs, teaching the value of hard work, dedication to achieving goals, and team work. Income from the fund shall be used to support the cross country and track and field programs.

The Douglas B. Hall '91 Memorial Endowment for Outdoor Experience was established in 2006 by his parents, Gerald '63 and Nancy Hall, and other friends, to remember Doug and honor his spirit of adventure. Expenditures will be made from the fund to provide assistance for Bucknell students enhancing their undergraduate or graduate educational experience by participating in activities such as rock climbing, spelunking, cross country skiing, hiking, canoeing and kayaking, or other adventurous activities. Eligible expenditures of the fund include the purchase of related equipment and supplies, training classes, group activities, and related travel and sundry expenses.

The Terry J. Hibbard Mechanical Engineering Fund was established under an agreement completed in 2005 and funded through a testamentary gift from Terry J. Hibbard, Class of 1971. The fund supports the students, faculty and programs of the College of Engineering, and is intended to enable the mechanical engineering program to educate students at the highest possible level.

The Sid Jamieson Endowment for Men's Lacrosse was established by men's lacrosse team alumni, family and friends in honor of Sid Jamieson, long-time coach of Bucknell's men's lacrosse team. Income from the fund shall be used to support the men's lacrosse program.

The Kalman Fund for Jewish Life and Learning was established in 1999 by Ernest M. Kalman '56, and his wife, Joan. The fund shall be used to nurture the life of the Jewish community at Bucknell and to deepen the understanding of Jewish thought, history and traditions among students of all faiths.

The George M. Kunkel Memorial Equipment Fund for Mechanical Engineering was established to support equipment purchased by the mechanical engineering department.

The Charles J. and Isabelle Kushell Music Endowment Fund is established by Charles J. and Isabelle Kushell, of Chicago, Illinois, graduates of Bucknell University in the classes of 1927 and 1926 respectively. The purpose of the fund is to augment both the instructional and the performance offerings of the department of music of Bucknell University by providing funds for bringing to the campus professional musicians, distinguished scholars, performing artists, or music educators of nationally recognized merit.

The Robert A. Latour Varsity Swimming and Diving Endowment was established in 2002 by William D. Dearstyne '62 to honor Bucknell's former head swimming and diving coach, Robert A. Latour, by supporting the University's Robert A. Latour Head Swimming and Diving Coach, and the University's varsity swimming and diving program.

The Leinbach Family Library Fund was established by Annabelle Rich Leinbach in honor of her son, Paul W. Leinbach, Class of 1954, and her daughter-in-law, Jeannette Grove Leinbach, Class of 1955. The income derived from this fund is used at the discretion of Bucknell's head librarian for acquisitions or other purposes related to the provision of services and materials to Bucknell's academic community.

The Library Technology Fund was established in 1999 by a member of the Class of 1980. The income derived from this fund is to be used at the discretion of the chief administrator of the University's library to keep the library current with changing technology.

The J. Wesley Little Memorial Art Fund was established in 1985 by Dr. Thomas M. Little, Class of 1931, in memory of his father, J. Wesley Little. Income from the endowment is to be used for the exhibition and acquisition of regional art.

The Dorothy "Bugs" Harvey '53 Lloyd Field Hockey Endowment was established by family and friends in memory of Dorothy Harvey Lloyd, Class of 1953. The endowment shall benefit the Bucknell women's varsity field hockey program.

The MacDonald Family Fund for the Institute for Leadership in Technology and Management was established by J. Randall and Kathleen MacDonald of Greenwich, Conn. Income from the fund shall be used at the discretion of the co-directors of the Institute for Leadership in Technology and Management. This income may be used to support any or all of the following components of the program: faculty salaries, program enhancement, support for guest speakers, student stipends, or curriculum development.

The Mildred A. Martin Fund for Poetry was established by Miss Martin, a Bucknell faculty member from 1940-72. Income from the fund will be used to promote the writing, study, and teaching of poetry, and for support of the programs and facilities of the Poetry Center.

The William C. McMurray Accounting Fund was established by William C. McMurray, Class of 1946, to support travel in the accounting program, especially travel by professors.

The Vivian Miller Fund for English was established under an agreement completed in 2002 and funded by a gift from Vivian Miller, mother of Amy P. Miller, Class of 1989. Income from the fund shall be used to support the Bucknell English department's efforts to enhance the artistic and intellectual atmosphere of the University.

The Bob Odell Head Football Coaching Endowment was established by Norman E. Garrity '63 and Mary Lou Roppel Garrity '64 to honor Bucknell's former head football coach, Robert Odell. The endowment is intended to provide perpetual budget support for the head football coach.

The Oliver/Walters Family Endowment for Mechanical Engineering was established by Richard E. Oliver, Class of 1970, his wife, Christine S. Oliver, his son, Stephen S. Oliver, Class of 2003, his daughter, Wendy Oliver Walters, Class of 1994, and his son-in-law, Russell H. Walters, Class of 1993. The fund shall be used to support student projects, field trips, and other activities that directly involve and benefit students in the mechanical engineering degree program.

The W. Guy Payne Fund was established by W. Guy Payne, Class of 1909, to help defray the expenses of students who attend religious conferences.

The Earle B. Pierson Jr. Fund was established by a testamentary gift from Ada T. Pierson, wife of Earle B. Pierson Jr., Class of 1938. The fund will be used to support the general purpose of the University.

The Reserve Officers Training Corps Scholarship Program was established by the United States Congress by enactment of the ROTC Vitalization Act of 1964. Through this act one-, two-, or three-year scholarships are awarded to students who have distinguished themselves academically at Bucknell and who may be considering a military career.

The Rooke Chapel Organ Assistants Fund was established by Natalie D. and Robert C. Rooke, the income to be awarded to one or more students taking organ lessons and/or working with the chapel organist to provide music for chapel functions.

The Rothschild/Johnson Art Experience Endowment was established in 2005 by Richard Rothschild '78 and his wife, Barbara, and Leslie Knox Johnson '83, in memory of Van Johnson '77. The endowment provides support for students, selected by competition, to explore the visual arts in New York City or other locations.

The James A. Russell Memorial Fund was established by James R. Russell in memory of his son, James A. Russell, Class of 1967. The fund shall be used for the acquisition of books, periodicals and other instructional materials for the Bertrand Library. In addition, the fund shall be used to support exhibitions that are scheduled in the special collections exhibit area of the Bertrand Library which has been named in memory of his son, James A. Russell, Class of 1967.

The Schlegel-Deibler Memorial Endowment was established by Richard LaMar Schlegel in memory of his parents, Roy F. and Margaret Deibler Schlegel. The fund supports staffing, programming and activities that foster a supportive environment in which gay/lesbian/bisexual students, as part of their education, can confidentially and in an

atmosphere of tolerance explore their identities. Further, the fund supports University outreach into related non-gay agendas.

The Gary A. and Sandra K. Sojka Equipment and Instrumentation Fund was established in 1998 by Bucknell's 13th president and his wife, Gary and Sandy Sojka, in support of faculty research in the life sciences. Income from the fund shall be used to purchase laboratory equipment, instrumentation, and supplies for research undertaken by faculty members and their associates in the department of biology.

The Sandra and Gary Sojka Visiting Poet Series in the Stadler Center for Poetry at Bucknell was inaugurated in 1995. Established through the generosity of the former president of Bucknell University and his wife, the series consists of a short visit by a distinguished poet during the fall semester each year. While on the campus, the poet offers a poetry reading, meets informally with those interested in conversation about the writing of poetry, and visits a poetry-writing workshop. The series is designed to contribute to the development of young writers while it also enriches the life of the University as a whole and of the larger community.

The Jack and Ralynn Stadler Poetry Endowment was established by Jack Stadler, Class of 1940, and his wife, Ralynn, in 1980 in recognition of the power of poetry and the importance of poetry's role in the cultural landscape. The endowment supports the activities and programs of the Stadler Center for Poetry.

The Isaac Tressler Fund for Astronomy was established by Isaac J. Tressler, Class of 1940, father of Connie Tressler McClymont '62 and Lloyd E. Tressler '63, and grandfather of Kimberly J. McClymont '90. Income from the fund shall be used to support the study of astronomy at Bucknell University.

The James H. and Elizabeth F. Turnure Purchase Fund for the Gallery was established in 1994 by James H. and Elizabeth F. Turnure. Income from the endowment may be used to purchase examples of western art and related artifacts created before the year 500 AD, specifically Egyptian, Mesopotamian, Aegean, and Greco-Roman, with Egyptian art and artifacts given priority.

The Vizas Family Fund was established in 2006 by Kathryn Vizas, Class of 1979, and her husband, Robert Vizas. Income from the fund shall be used to support the programmatic needs of Bucknell's Posse Program. The program assists public high school students with extraordinary academic and leadership potential, but whom the traditional college selection process may overlook. Students receive training leadership, team-building, communication, and academic excellence.

The Fitz Roy and Mary Jane Walling Management Endowment was established in 2006 by Fitz Roy '46 and Mary Jane Walling. The fund supports management education at the highest possible level by aiding the students, faculty and programs of the College of Arts and Sciences with preference for the department of management.

The Wean Foundation Fund for Library Electronic Resources was established in 1999 by The Raymond John Wean Foundation. The income derived from this fund is to be used at the discretion of the chief administrator of the University's library for the acquisition of computer workstations and related hardware for the library, in order to keep current with changing technology.

The Sigfried Weis Endowment for the Performing Arts was established in 1995 by a bequest from the estate of Sigfried Weis, former chairman of Bucknell's Board of Trustees and long-time friend of the University. Income from the endowment is used to compensate artists performing in the Weis Center, and to maintain, renovate or improve the Weis Center facilities.

Lectureships

The Charles Martin and Elizabeth Stults Bond Lectureship on the meaning of religion was established in 1967 by colleagues, alumni, and friends. It is filled from time to time, upon the invitation of the department of religion, by a person who has made significant contributions in the general area of religious interpretation, thought, and action.

The Class of 1953 Lectureship was established by the class as a 25th Reunion gift to the University. Its purpose is to bring to the campus for a brief residency every other year one or more distinguished visitors representing a broad spectrum of interests and disciplines.

The Class of 1956 Lecture was established in recognition of inspirational teaching. The lecture is to be given annually by a member of the faculty of Bucknell University. The committee which selects the recipient of this lectureship consists of the provost, deans, two faculty representatives and two student representatives.

The Martin and Arlene Cummings Lectureship was established by Martin M. '41 and Arlene Avrutine Cummings '42, to provide annual lectures and residencies by distinguished scholars who will discuss and speak on the history of science, scientific inquiry, and the effects of science on culture, politics, and the human condition.

The Ralph B. Derr Memorial Lectureship was established with funds from the estate of Ralph B. Derr, Class of 1917, in his memory. The speaker for the annual lecture will be a person of note from the field of chemical engineering, selected by the chemical engineering faculty to speak on an area of particular current interest in the profession.

The James A. Gathings Lectureship in International Politics, established in 1971 by students, colleagues, and friends of Professor Gathings, annually presents a significant analyst in this field. The designated lecturer, to be selected by the department of political science, shall possess a particular knowledge of international politics, together with a concern for the political education of all, regardless of academic training or specialty.

The O. V. W. Hawkins Lectureship was established by the Board of Trustees, with funds provided by Mr. Hawkins, who was, himself, a trustee for many years. The lecture is to be in the field of public policy, but not limited to politics or government, and is to be given by a respected person of national prominence.

The Arnold L. Putterman Lectureship was established by Arnold L. Putterman, Class of 1960, in memory of Isaac and Pearl Putterman. The subject of the annual lecture is to be in the humanities, the social sciences, the history of philosophy, or the history of the natural sciences.

The Harry Wolcott Robbins Lectureship was established in 1957 in honor of Harry Wolcott Robbins, John P. Crozer Professor of English and chairman of the department of English from 1923-54. Funded originally by the University and now endowed with a bequest from Mrs. Robbins, the lecture is given annually by a person who has made significant contributions to English and American literary scholarship.

The Roy Wood Sellars Lectureship commemorates the productive collaboration of Sellars, founder of the critical realist movement in American philosophy, and William Preston Warren, historian of the movement and editor of Sellars' writings. Initiated by Sellars, the lectureship was augmented by students and colleagues of Warren, former professor of philosophy at Bucknell. A distinguished scholar in American philosophy lectures annually.

The Ralph Spielman Memorial Lectureship was established by the relatives, colleagues, students, and friends of Professor Spielman in memory of his service to the University from 1958 until his death in 1978. The lectureship emphasizes "Frontiers in Social Science" by bringing to the campus when possible, but at least every second year, a lecturer to describe promising attempts to interpret and open new fields in social science.

The Douglas Sturm Dialogue on Ethics and Social Justice was established in 1992 in honor of Dr. Sturm who served Bucknell for more than 35 years as a teacher and scholar. The dialogue is intended to honor Dr. Sturm's substantive concerns with ethics and social justice issues and his commitment to the honest exchange of ideas on those matters.

The Virginia Travis Lectureship in Social Justice was endowed by her family and friends to commemorate her life and convictions. The lecturer ordinarily will be a member of the Bucknell or Lewisburg communities who has worked compassionately and diligently to promote justice and social change at the local, national, or international level. The annual lecture will articulate a vision of justice and a strategy of social change to achieve it.

The Charles H. Watts II Humanities Institute was established in 2006 by the CTW Foundation and its officers, to honor the memory of Charles E. Watts II, Bucknell's 11th president from 1964-76 and trustee from 1997-2001. The fund honors President Watts' love of the humanities, his dedication to learning, and his exceptional leadership at Bucknell. The fund will provide annual support for the interdisciplinary study of a selected topic of interest in the humanities at Bucknell.

The Janet Weis Fellowship in Contemporary Letters, an award established at Bucknell University through a generous grant from the Degenstein Foundation in honor of Janet Weis, is named annually to honor and recognize an individual who represents the very highest level of achievement in the craft of writing within the realms of fiction, non-fiction, or biography. Each recipient of this fellowship is an author whose work has been accessible to a wide audience and has resulted in a broadly based record of public recognition and appreciation.

Prizes and Academic Awards

The following prizes and academic awards have been established, but no prize is given unless a high degree of merit is achieved. Awards from these funds shall be made in compliance with the University's policy of nondiscrimination.

The Alpha Chi Sigma Fraternity Prizes are awarded to the most deserving chemistry graduate chosen at the discretion of the chemistry department and to the most deserving chemical engineering graduate chosen at the discretion of the chemical engineering department.

The American Chemical Society Undergraduate Award in Analytical Chemistry is awarded annually to a student who has displayed interest in and aptitude for a career in analytical chemistry during the first, sophomore, and junior years.

The Stephen A. Barowsky Prize, established by friends of Stephen Barowsky and by the Barowsky family, is awarded in recognition of exceptional leadership qualities, to a student who has completed the junior year.

The Herbert Goodman Barrows Prizes were established by the Reverend William Barrows, A.M., Class of 1897, in memory of his son, for one or two seniors with the highest standing in, respectively, the Latin language and literature, and the Greek language and literature.

The William P. Boger Jr., M.D. Award was established in 2006 by William P. Boger Jr. M.D., Class of 1934, in memory of his parents, Ester Good Boger and William Pierce Boger, who, in the depth of the Depression, made so many personal sacrifices to make his education possible. The prize shall be awarded to an outstanding senior, who has indicated a desire to spend his or her career in medicine or the biological sciences.

The Bucknell Prizes for Women were founded by William Bucknell, and consist of:

A prize for that woman of the graduating class who has the highest four-year average.

A prize for that woman of the graduating class who, being excellent in scholarship during her senior year, shows the greatest proficiency in English composition and literature.

A prize for that woman of the junior class who, being excellent in scholarship during her junior year, shows the greatest proficiency in English composition and literature.

A prize for that woman of the sophomore class who, being excellent in scholarship during her sophomore year, shows the greatest proficiency in English composition and literature.

A prize for that woman of the first-year class who makes the greatest advance in English composition and literature during the first year.

The University offers similar prizes for men called the University Prize for Men.

The CBS/Sony Prize in Japanese Studies, established by CBS/Sony, Incorporated, is awarded to a member of the graduating class who gives promise of further contributions to the understanding between Japan and the United States.

The Ernest and Josephine Christensen Award, established to honor Mr. and Mrs. Ernest Christensen, is given to an outstanding graduate in engineering.

The Class of 1905 Art Prize, endowed by Edith Kelly Fetherston in honor of the 50th Reunion of the Class of 1905, is given to the member of the graduating class whose work in creative art has been outstanding.

The Roger J. Claus Prize is awarded to a member of the graduating class in civil engineering who has shown the greatest improvement and promise for professional achievement and public service.

The David R. Crossgrove Prize, established by Sara Deck Crossgrove '28, is awarded to a senior pursuing a career in the legal profession, who combines scholastic achievement and campus leadership with a strong code of ethics and a vision of attaining fairness in the legal profession.

The John R. Crossgrove Prize is awarded to a senior majoring in business or economics who combines scholastic achievement in the business curriculum with exceptional leadership qualities in the campus community.

The Eleanor D. Decker Prize for Women was endowed by Dr. Oliver J. Decker in memory of his wife; it is to be given to the woman of the graduating class who, in the judgment of the president of the University, the vice president for academic affairs, and the dean of student life, or of such committees as they may appoint, most embodies the highest qualities of cultured Christian womanhood and the promise of a high degree of usefulness to society. No person shall be barred from consideration for this prize because of religious faith or because of race or color. The University offers a similar prize for men called the University Prize for Men.

The Oliver J. Decker Prizes were established by Oliver J. Decker, LL.D., Class of 1889, and consist of a prize for that member of the graduating class not in an engineering department who has attained the highest average, all courses having been taken at Bucknell University; and a prize for that member of the graduating class from the College of Engineering who has attained the highest average, all courses having been taken at Bucknell University.

The Delta Mu Delta Fraternity Prizes are given to that member of the senior class in business administration who obtains the highest average in business subjects during the student's years in the University and to the MSBA candidate who demonstrates outstanding scholarship in completing the Essay/Thesis requirement for that degree.

Distinguished Military Graduate. A Distinguished Military Graduate, selected by the professor of military science, or by higher command, is one who has been a Distinguished Military Student; who has completed the Advanced Course, Senior Division, of the Reserve Officers Training Corps; who is a member of the graduating class and is receiving a baccalaureate degree; and who has maintained the standards required of a Distinguished Military Student during the period between such designation and the date of graduation.

Distinguished Military Student. A Distinguished Military Student, selected by the professor of military science, is one who possesses outstanding qualities of military leadership, a high moral character, and a definite aptitude for the military service; whose academic record or demonstrated leadership shows distinction; and who has completed, or will complete within one year, the Advanced Course, Senior Division, of the Reserve Officers Training Corps.

The Eastern College Athletic Conference Medallion is awarded to a man and a woman, at the end of their junior year, in recognition of excellence in scholarship and athletics.

The George R. Faint Prize, established by his colleagues in recognition of his services to the University as Registrar, is awarded to a student in liberal arts whose work during the first, sophomore, and junior years is of generally high quality and gives promise of future excellence.

The John S. Gold Mathematics Award, established by Beta chapter of Pi Mu Epsilon, national honorary mathematics society, is an award to area high school students and their schools, based on a competitive examination.

The William C. Gretzinger Prize was established in honor of William C. Gretzinger, A.M., Class of 1889, the first registrar of the University, by the heirs of Mr. Gretzinger, and by the University, for the senior with the highest standing in economics.

The Barbara Watson Grever Prize was endowed by family and friends in memory of Barbara Watson Grever, Class of 1967, and is to be awarded to an outstanding musician with preference being given to a student of voice or piano. A junior student will be designated by the department of music as the intended recipient. The Grever Prize will be awarded at the end of the senior year.

The Professor William T. Grier Prize was established by the Class of 1871 for the first-year student with the highest standing in Latin.

The Allan Gates Halline Prize in American Literature, the proceeds of a fund contributed by the friends of Dr. Halline, will be awarded annually to the student who makes the best record in one year's work in American literature.

The Jeffrey James Harold Prize was established in memory of Jeffrey James Harold, Class of 1978, for the student in electrical engineering who achieves the highest cumulative grade point average for the first year.

The H. Boardman Hopper Prize, given by Mrs. H. Boardman Hopper in memory of her husband, is awarded to the graduating senior whose degree is achieved by unusual perseverance.

The Professor George Allison Irland Prize, established in memory of her husband by Lillian S. Irland, is awarded annually to that member of the graduating class who has the highest standing in electrical engineering.

The Alvin F. Jackson Jr. '59 Memorial Scholar-Athlete Award, which honors the memory of an alumnus and father of a member of the Class of 1989, is given for excellence in athletics and academics, leadership, loyalty, and courage.

The Michael D. LaGrega Award for Excellence in Environmental Engineering is awarded to a member of the graduating class in civil and environmental engineering whose academic achievements and interests show outstanding promise for a career in environmental engineering.

The W. Norwood Lowry Prize is awarded to that member of the graduating class enrolled in physics who shows the greatest achievement and promise in physics.

The Dorothy Walls McCormick Prize was established by William C. Walls in honor of his daughter, Dorothy Walls McCormick, to be awarded to that student in the graduating class from Union County or a designated portion of Northumberland County who, during his or her senior year, has demonstrated qualities by which other students have been helped in their daily living and in their personal development.

The Hugh F. McKeegan Prize is awarded to the master's degree recipient specializing in educational administration or supervision who, in the judgment of the faculty of the education department, best exemplifies those qualities of character, scholarship, leadership, and professional commitment needed for effective leadership in the school.

Where there are no master's degree candidates who meet the above criteria, the prize should be awarded to a graduating senior, preferably with a major or concentration in English or social studies, who has earned teaching certification and who, in the judgment of the department of education, best exemplifies those qualities of character, scholarship, skill in teaching, and commitment to young people required for effective service in the teaching profession.

The Harold W. Miller Prize has been established by the University Honors Council through contributions from friends and alumni to honor the memory of Professor Miller, who founded the Honors Program at Bucknell, and to encourage excellence in honors work.

The Moles Civil Engineering Award, established by The Moles Society, is awarded to the civil engineering student whose academic achievement and application for the first three years show outstanding promise for a career in construction engineering and management.

The J. William Moore Prize was established by gifts from students, friends, family, and colleagues of Professor Moore. The prize is awarded to the senior who most completely exemplifies the original goal of a historic Bucknell education. First and foremost, he/she demonstrated in his/her life, in a significant way, traditional Christian values, including courage, honesty, and compassion for others. He/she also has achieved high academic success in coursework in education.

The William H. and Carl W. Neff Prize is awarded to a member of the graduating class in mechanical engineering who, through positive attitude, desire, and determination, has shown exceptional academic and personal growth during his/her academic career at Bucknell.

The Richard P. Nickelsen Prize is awarded to a senior demonstrating outstanding performance in geology.

The Elizabeth M. Oliphant Prize was established by Professor J. Orin Oliphant in memory of his wife, and is to be awarded annually to that woman of the graduating class who, being generally excellent in scholarship, has obtained in the courses required for a major in chemistry, or in any subject in biological science, the highest average of those women of her class whose majors are within these fields. The University offers a similar prize for men called the University Prize for Men.

The J. Orin Oliphant Graduation Prize was established by J. Orin Oliphant, professor emeritus of history, to be awarded to that senior attaining the highest average among those receiving the degree of bachelor of arts.

The Phi Beta Kappa Award is given to the undergraduate who, by work of art, research, or scholarship, shows, in any discipline, conspicuous achievement.

The Professor George Morris Philips Prize was established by the Class of 1871 for the first-year student with the highest standing in mathematics.

The Pi Mu Epsilon Society Prize is awarded to that member of the graduating class whose work in mathematics has been outstanding.

The President's Award for Distinguished Academic Achievement was established to recognize annually all students who have demonstrated, according to established criteria, a high level of academic excellence.

The Matthew B. Ridgway Jr. Award, established in memory of the late Matthew B. Ridgway Jr., Class of 1971, is given by the George C. Marshall Research Foundation to the member of the graduating class who best exemplifies the character, selflessness, integrity, and dedication to country demonstrated by General Marshall and by Matthew Ridgway Jr.

The Louis W. Robey Prize, endowed by friends in honor of Louis W. Robey, A.D., LL.B., LL.D., Class of 1904, is given to the man and woman in the senior class who best exemplify the aims of a Bucknell education.

The Walter H. Sauvain Prize, endowed by friends of Professor Sauvain, for 36 years professor of education at Bucknell and an adviser of many undergraduate and graduate students in education, is awarded to the senior majoring in education who shows the greatest achievement and promise for professional growth and service.

The Thelma Johnson Showalter Award was established by the Pennsylvania Federation of Women's Clubs Department of International Affairs in honor of Thelma Johnson Showalter, Class of 1929, for that member of the graduating class who, in the judgment of the president of the University or such committee as may be appointed, shall have shown the greatest potential in the field of public and community affairs.

The Julia Fonville Smithson Memorial Prizes, one for poetry and one for fiction, are to be awarded annually for excellence in undergraduate writing, to students whose dedication to the sharing and the making of literature carries into the future the spirit of Julia Smithson.

The Helen E. Sprague Prize was established by Frank A. Sprague, professor of Spanish, in memory of his wife, and is to be awarded annually to that member of the graduating class who demonstrates exceptional ability in Spanish.

The Ralph A. Still and Anne B. Still Prize was established by the Class of 1913, and is to be awarded annually to that member of the junior class majoring in English who has the highest standing in English.

The Susan Hensinger Thomas Prize, established in her memory by members of Alpha Phi, is awarded to the graduating senior who best promotes goodwill by applying an understanding of psychological principles to daily living.

The Herbert Tustin Prize was established by Professor Francis Wayland Tustin, Ph.D., Class of 1856, in memory of his son, for the senior with the highest standing in philosophy and psychology.

The Anna Slifer Walls Prize was established by William C. Walls, A.B., A.M., Class of 1873, in memory of his wife, Anna Slifer Walls, for that student from Union County or a designated portion of Northumberland County majoring in history who presents during his or her senior year the best paper concerned with American history.

The Dr. E. Slifer Walls Prize was established by William C. Walls in memory of his son, Dr. E. Slifer Walls, Class of 1903, to be awarded upon graduation to the premedical student or public health student from Union County or a designated portion of Northumberland County who has shown during his or her junior year the highest standards of combined will and devotion to the ideals of the profession for which he or she is making preparation.

The John A. Walls Prize was established by William C. Walls in honor of his son, John A. Walls, Sc.D., to be awarded to that student from Union County or a designated portion of Northumberland County who, during his or her sophomore year, has performed outstanding work in literature, history, the physical sciences, or engineering.

The Agnes Archer Warren Award, established in honor of the wife of Dr. W. Preston Warren, professor of philosophy emeritus, consists of selected books awarded to a student in the College of Arts and Sciences for a written work demonstrating well-informed use of a range of sources in several disciplines.

The W. Preston Warren Prize, endowed by friends in honor of Professor Warren, for 26 years a distinguished professor of philosophy at Bucknell, is awarded to that senior majoring in philosophy who shows the greatest achievement and promise in philosophy.

The Charles F. White Memorial Prize for Scholar-Athletes was established in 1991 to honor and reward a student or students recognized by the University as earning the designation "Scholar-Athlete" as defined by the University and who intends or intend to pursue graduate studies either immediately or in the future.

The Yarnall Prize in Environmental Affairs, endowed by Dr. John L. Yarnall in memory of his father, mother, and brother, is awarded to a junior or senior who has a high academic standing and has demonstrated leadership in and contribution to environmental affairs.

The Samuel Lewis Ziegler Prizes were established by the late Samuel Lewis Ziegler, M.D., LL.D., Class of 1880, and consist of a prize for the first-year student whose preliminary examinations in English show the greatest proficiency in the elements of English composition; a prize for the junior who shows the greatest proficiency in English composition and literature; a prize for the member of the class in French Conversation who excels in this subject; and a prize for the senior who best exemplifies the goals of a premedical education.

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Assistant Director, Employment Services, Trish Haire, PHR
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Director, Donald A. Krech, M.Litt.
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Chief, Jason D. Friedberg, M.S.
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Reservation, Information, and Conference Services
Director, Judith Rose Mickanis
Assistant Director, Jeanne Hafer
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The date in parentheses following each name is the year of initial appointment to the Bucknell faculty. Listings are accurate as of the publication deadline of this catalog.

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Rosemary Ellen Shinko (2007), Visiting Assistant Professor of International Relations, Ph.D. Connecticut
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Lieutenant Colonel Robert S. Oreskovic, M.B.A. Golden Gate University

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Ryan Crawford, Assistant Football Coach, B.S. Davidson
Nathan Davis, Assistant Men's Basketball Coach, B.A. Randolph-Macon
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Leslie Moore, Game Operations Manager, M.S. West Virginia University
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Mark Prosser, Assistant Men's Basketball Coach, B.A. Marist College

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Brent Thompson, Assistant Football Coach, B.S. Norwich University
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Steve Vashel, Assistant Football Coach, M.Ed. Springfield College
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Mario Wilson, Assistant Track Coach, M.Ed. St. Francis
Daniel Wirnsberger, Head Wrestling Coach, B.S. Michigan State
Dan Wollenben, Assistant Women's Rowing Coach, B.A. Fordham
Eric Wood, Strength and Conditioning Intern, B.S. Juniata
John Zeigler, Head Men's and Women's Water Polo Coach, J.D. Widener School of Law

Abbreviations and Codes

Abbreviations used in recording the various curricula and programs described in this *Catalog* or used in schedules of classes and on students' records are given below. Please note that these symbols do not necessarily correspond with academic departments and programs or with approved majors and minors; e.g., JYAB, junior year abroad, denotes approved course credit earned abroad.

Subject	Code	Subject	Code
Animal Behavior	ANBE	Humanities	HUMN
Anthropology	ANTH	Interdepartmental	IDPT
Arabic	ARBC	International Relations	IREL
Art	ART	Italian Studies	ITAL
Astronomy	ASTR	Japanese	JAPN
Biology	BIOL	Junior Year Abroad	JYAB
Biomedical Engineering	BMEG	Latin	LATN
Cell Biology/Biochemistry	BICH	Latin American Studies	LAMS
Capstone Experience	CAPS	Linguistics	LING
Chemical Engineering	CHEG	Maintenance of Candidacy	MCAN
Chemistry	CHEM	Management	MGMT
Chinese	CHIN	Mathematics	MATH
Civil and Environmental Engineering	CENG	Mechanical Engineering	MECH
		Military Science	MILS
Classics	CLAS	Music	MUSC
Computer Science	CSCI	Neuroscience	NEUR
Dance	DANC	Non-departmental	NDPT
East Asian Studies	EAST	Nontraditional Study	NTST
Economics	ECON	Off-campus Studies	OCST
Economics and Mathematics	ECMA	Philosophy	PHIL
Education	EDUC	Physics	PHYS
Electrical Engineering	ELEC	Political Science	POLS
Engineering	ENGR	Psychology	PSYC
English	ENGL	Religion	RELI
Environmental Studies	ENST	Residential College	RESC
Foreign Language Programs	DFLP	Russian	RUSS
Foundation Seminar	FOUN	Sign Language, American	SIGN
French	FREN	Sociology	SOCI
Geography	GEOG	Spanish	SPAN
Geology	GEOL	Theatre	THEA
German	GRMN	University Course	UNIV
Greek	GREK	Washington Semester	OCST
History	HIST	Women's and Gender Studies	WMST

Within the parentheses following the title of each course, in the "Course Descriptions" sections of this *Catalog*, the following designations are used:

- "I" indicates the first (fall) semester, "II" the second (spring) semester.
- The word "and" between "I" and "II" designates a course which is given in each semester.
- The word "or" between "I" and "II" designates a course may be given in either one of the semesters.

- The letter "A" preceding "I" or "II" indicates a course given in alternate years.
- The letter "S" designates a course offered during the summer session.
- The letter "R" following the semester designation indicates that the course may be repeated for credit when the subject matter is significantly different.
- The first number after the semicolon shows the number of hours of classroom work for each week in a semester.
- The second number after the semicolon shows the number of hours in each week devoted to work in the laboratory, in the studio, or on field trips, etc. (The number of class hours for a course may vary. In most courses where class hours weekly are indicated, but not laboratory hours, the student is expected to compensate for omitted class or laboratory work by independent study.)
- "TBA" in any position within the parentheses indicates that the information was not available for inclusion.

The symbol "NT" appearing as a course designation (e.g. POLS 3NT) denotes nontraditional study on the elementary (1NT), intermediate (2NT) or advanced (3NT) level.

Courses numbered below 200 are elementary and introductory courses; those numbered from 200 to 299 are more advanced, usually based upon prerequisites fulfilled either in secondary school or in college; courses numbered 300 and above are advanced courses usually having prerequisites at the college level.