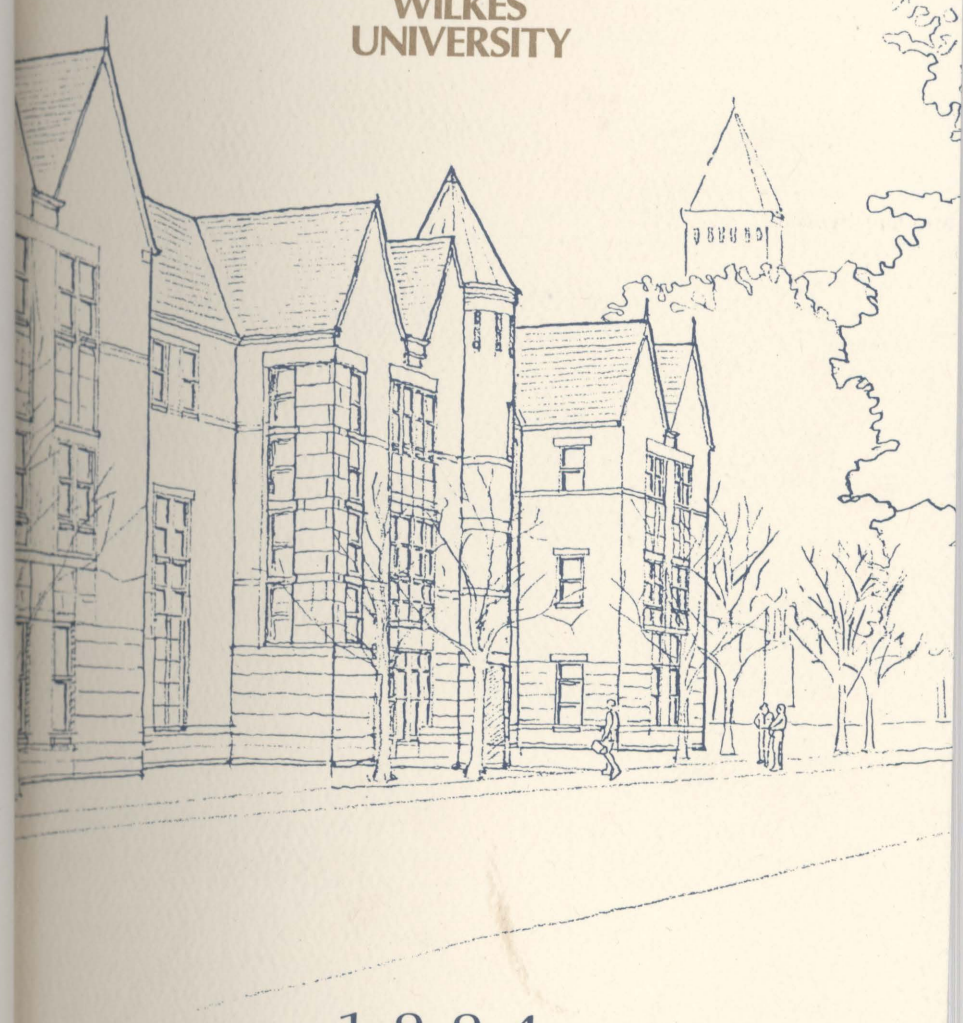
WILKES
UNIVERSITY



1994
BULLETIN
1995

CORRESPONDENCE DIRECTORY

Write or contact these persons for additional information on particular matters:

Christopher N. Breiseth
President
General institutional policy.
FAX: (717) 824-2934

J. Michael Lennon
Vice President for Academic Affairs
Curriculum and academic affairs.
FAX: (717) 824-2934

Emory Guffrovich
Dean of Admissions
Admission to Wilkes undergraduate and graduate programs and visits to the campus for tours and interviews.

Rachael L. Lohman
Director of Financial Aid
Financial aid and scholarships.
FAX: (717) 831-4902

John F. Meyers
Registrar
Readmission, registration, graduation audit, and academic records of currently enrolled or former students.
FAX: (717) 831-4902

Jane Lampe-Groh
Dean of Student Affairs
Student affairs, readmission.
FAX: (717) 831-4907

Philip L. Wingert
Athletic Director
Intercollegiate athletics.

Leigh E. Major
Associate Dean of Student Affairs for Residential Life
Residential matters for enrolled students.
FAX: (717) 831-4907

Edward W. Wood
Assistant Director of Financial Management
Student accounts and other financial arrangements for new and currently enrolled students.
FAX: (717) 831-4902

Paul S. Adams
Dean of Academic Support Services
Academic advising, tutorial services. Evening, Summer and Keystone Weekend programs — admission and advisement.

Judith A. Sullivan
Coordinator of Continuing Education
Professional development programs and non-credit courses.

Wagiha Abdel-Gawad Taylor
Dean of Graduate Studies
Graduate programs and programming.

Mailing address:
WILKES UNIVERSITY
Wilkes-Barre, PA 18766

Office Hours: 8:30 to 4:30
Monday through Friday

(717) 831-5000
(800) WILKES-U
(800) 945-5378

Statement of Disclaimer

The statements in this Bulletin are for purposes of information. The University reserves the right to change any provisions or requirements, including tuition and fees at any time within the student's term of residence. No contract is created or implied. Students must fulfill all prevailing degree or program requirements.

The front cover is an architect's sketch of the new classroom/office complex under construction on South Franklin Street. This building, designed by the Hillier Group of Princeton, New Jersey, is the beginning of a $25,000,000 campus improvement project at Wilkes University.

Wilkes University

1994-95

Bulletin

Baccalaureate Studies

WILKES UNIVERSITY
Wilkes-Barre, Pennsylvania 18766
Telephone (717) 831-5000

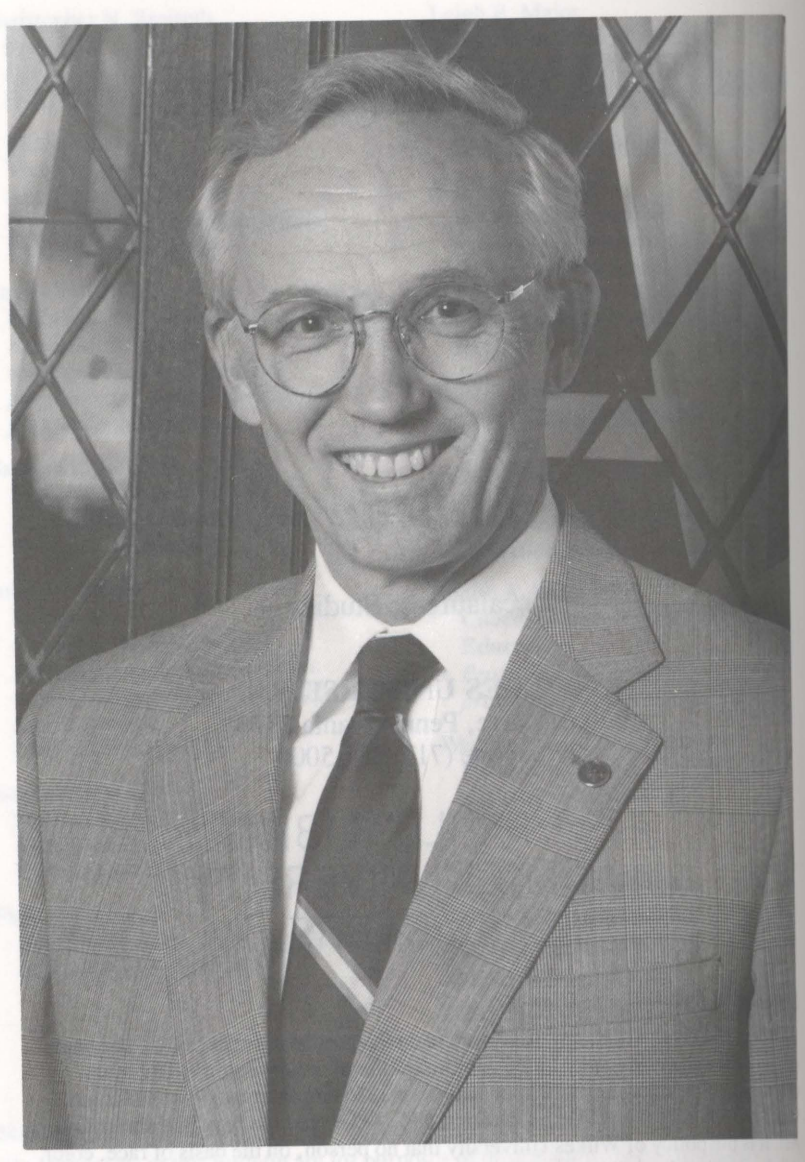
E.S. FARLEY LIBRARY
WILKES UNIVERSITY
WILKES-BARRE, PA

Statement of Nondiscrimination

Wilkes University does not discriminate on the grounds of race, color, national origin, sex, age or disability in the administration of or admission to any of its educational programs, activities, or with respect to employment, in compliance with Title VI, Title VII, Title IX, Section 504, ADA, and the Age Discrimination Act. It is the policy of Wilkes University that no person, on the basis of race, color, religion, national origin or ancestry, age, sex, marital status, disability, sexual or affectional preference, or Vietnam-era veteran status, shall be discriminated against in employment, educational programs and activities, or admissions. Inquiries may be directed to the Dean of Student Affairs or the Affirmative Action Officer (ext. 4500).

The University complies with the Ethnic Intimidation Act of 1982 of the Commonwealth of Pennsylvania which provides additional penalties for the commission of illegal acts of intimidation when such actions are motivated by hatred of the victim's race, color, religious or national origin.

A Message from the President



Christopher N. Breiseth, President

At Wilkes you will encounter an exciting intellectual and social community. As you define your role in this community of learners and scholars, you will come to know the challenges and joys — as well as the controversies — of the collegiate life that we share and love.

I sincerely believe that as you invest your time and talents at Wilkes to achieve your own definition of success and fulfillment, you will discover that you are becoming part of Wilkes and that Wilkes is becoming part of you.

An Educated Man or Woman

seeks truth, for without truth there can be no understanding;

possesses vision, for we know that vision precedes all great attainments;

is aware of the diversity of ideas and beliefs that exists among all people;

has faith in the power of ideals to shape the lives of each of us;

knows that mankind's progress requires intellectual vigor, moral courage, and physical endurance;

cultivates inner resources and spiritual strength, for they enrich our daily living and sustain us in times of crisis;

has ethical standards by which to live;

respects the religious convictions of all people;

participates constructively in the social, economic, cultural, and political life of the community;

communicates ideas in a manner that assures understanding, for understanding unites us all in our search for truth.

—Formulated and adopted by the Wilkes University faculty as a guide to learning.

96-196131

A Message from the President

Contents

Wilkes University
Overview and History . . . 7
Statement of Institutional Mission and Goals . . . 9
Accreditation . . . 14
Buildings and Facilities . . . 14

Admissions
Admission Requirements . . . 17
Admission Procedures . . . 18
Advanced Placement . . . 21

Expenses and Financial Assistance
Tuition and Fees . . . 26
Payment Options . . . 28
Financial Aid . . . 32
Application Procedures . . . 32
Types of Financial Assistance . . . 32

Student Affairs and Athletics
Student Activities and Athletics . . . 38
Student Services . . . 41
Counseling . . . 42

Academic Information
Goals of the Educational Program . . . 46
The Curriculum . . . 47
The Degrees . . . 47
Adult, Graduate and Continuing Education . . . 53
Academic Policies and Procedures . . . 55
Grades . . . 57
Graduation Requirements . . . 60

Academic Courses and Programs
School of Business, Society and Public Policy . . . 62
School of Liberal Arts and Human Sciences . . . 63
School of Science and Engineering . . . 64
Accounting . . . 66
Aerospace Engineering . . . 70
Aerospace Studies (AFROTC) . . . 71
Anthropology . . . 75
Applied and Engineering Sciences . . . 77
Art . . . 80
Biochemistry . . . 87
Biology . . . 89
Business Administration . . . 97
Chemical Engineering . . . 109
Chemistry . . . 110
Civil Engineering . . . 116
Communications . . . 117
Computer Information Systems . . . 128
Computer Science . . . 131
Dance . . . 138
Earth and Environmental Sciences . . . 141
East European and Russian Studies . . . 150
Economics . . . 152
Education . . . 158

Contents

Electrical Engineering . . . 165
Engineering Management . . . 173
English . . . 177
Environmental Engineering . . . 186
Foreign Languages . . . 191
French . . . 191
German . . . 194
Russian and other Languages . . . 196
Spanish . . . 197
Health Sciences . . . 199
Premedical Programs . . . 201
Allopathic Medicine . . . 201
Guthrie Premedical Scholars Program . . . 204
Osteopathic Medicine . . . 205
Predoctoral Professional Programs . . . 206
Dentistry . . . 208
Optometry . . . 209
Podiatry . . . 209
Veterinary Medicine . . . 209
Allied Health and Pre-Pharmacy Programs . . . 210
Health Information Management . . . 211
Occupational Therapy . . . 212
Physical Therapy . . . 213
Pre-Pharmacy . . . 214
History . . . 219
Individualized Studies . . . 220
Industrial Engineering . . . 226
International Studies . . . 226
Materials Engineering . . . 227
Mathematics . . . 230
Mechanical Engineering . . . 237
Medical Technology . . . 247
Military Science (Army ROTC) . . . 253
Music . . . 255
Nursing . . . 258
Pharmacy . . . 270
Philosophy . . . 276
Physical Education . . . 278
Physics . . . 283
Political Science and Public Administration . . . 286
Pre-Law Studies . . . 295
Psychology . . . 302
Sociology . . . 303
Theatre Arts . . . 307
Women's Studies . . . 313

Interdisciplinary Courses
University-wide Interdisciplinary Core Studies Courses . . . 317
School-wide Interdisciplinary Courses . . . 318

Personnel of the University
Board of Trustees . . . 318
Administration . . . 320
Faculty . . . 321

Index . . . 328



Wilkes University

Overview

Wilkes is a comprehensive, independent institution of 2,200 undergraduate and 500 graduate students, located in the historic district of Wilkes-Barre in the Pocono region of northeastern Pennsylvania. Formerly Wilkes College, Wilkes was granted university status by the Commonwealth of Pennsylvania in January of 1990. The University is structured as three academic units: the School of Business, Society, and Public Policy; the School of Liberal Arts and Human Sciences; and the School of Science and Engineering. A broad range of bachelor's and master's programs are offered in the humanities, social and natural sciences, business administration, nursing, and engineering. The park-like campus parallels the Susquehanna River and features the newly constructed Marts Sports and Conference Center, fully equipped science and engineering facilities, and a number of architecturally significant nineteenth century mansions, renovated for use as residence halls and academic buildings. The center of regional theater, ballet, and musical performances, Wilkes-Barre is 2½ hours from the cultural resources of either New York City or Philadelphia. Wilkes draws its increasingly diverse student body from Maine to Florida, and especially from the New York-Philadelphia-Baltimore-Washington, D.C. population corridor. The University is accredited by the Commission on Higher Education of the Middle States Association of Colleges and Schools, and has specialized accreditation in nursing and engineering.

The Wilkes undergraduate curriculum focuses on a strong and innovative set of General Education Requirements in the arts and sciences, required of all students, which includes interdisciplinary seminars, instruction in public speaking, and technological literacy components. Majors are available in over twenty-five fields, with business administration, biology, engineering, nursing, psychology, communications, and music attracting the largest number of students. Teaching excellence is the highest priority for the 150-member faculty, while academic advising integrated with career planning is also stressed. Hands-on experiences are provided in laboratory, internship, and cooperative education settings, creating Wilkes' distinctive "craftsman-apprentice" learning environment.

Residential facilities on campus accommodate 800 students, and campus housing is available for all four years. Residential alternatives range from traditional single-sex dormitories to coeducational facilities, with men and women in different sections of the same building. Architecturally, residence halls vary from modern, multifloor buildings to mansions listed on the National Register of Historic Places. Medical and dental care, department stores, specialty shops, and banks are available within one block of the cam-

pus. The historic district includes a large number of churches and synagogues, as well as an Islamic Center, which welcome students' participation in worship and youth activities.

An active and varied intramural program involves the majority of students. Intercollegiate athletics encompass fourteen sports. Athletic scholarships are awarded only in wrestling, which is a nationally competitive NCAA Division I program. Other sports are administered in strict conformity with NCAA Division III regulations.

History

The institution that is now Wilkes University was founded in 1933, when the Trustees of Bucknell University established a branch, two-year campus in Wilkes-Barre. The new college, known as Bucknell University Junior College, was successful in attracting as students, able and highly motivated young persons, virtually all of whom were the first members of their families to benefit from higher education. The college also received support and encouragement from leading members of the Wilkes-Barre community, many of whom served on the Board of Trustees. The stately mansions on campus donated to the college, that are now used by the university for some of its residence halls and offices, testify to the tradition of community service and generosity characteristic of the Wilkes-Barre area's leadership. The college was especially fortunate to have its own inspired and talented leaders in Arnaud C. Marts, president of Bucknell, and Eugene S. Farley, director of the Wilkes-Barre campus.

In 1947, the institution became Wilkes College, an independent, non-denominational four-year college, with programs in the arts and sciences and a number of professional fields as well as a full program of extra-curricular activities. The student body and faculty grew rapidly in the 1950's, and expansion into graduate studies followed in the 1960's and 1970's.

In the 1980's, Wilkes gained recognition as an increasingly sophisticated regional center for teaching, academic research, cultural affairs, and public service programs. Designation as Wilkes University in 1990 capped an eventful and productive half century of development, and signaled the beginning of a new era of progress as an increasingly distinguished and prominent academic institution.

Statement of Institutional Mission and Goals

The Wilkes Tradition

Community Service

Founded in 1933 as a junior college, Wilkes came into existence in the midst of the economic crisis caused by the simultaneous collapse of anthracite coal mining in Northeastern Pennsylvania and the onset of the Great Depression in the nation and the world. The College fulfilled the important mission of making higher education accessible to ambitious but underprivileged youth and producing new leadership for an area in dire need of renewal and hope for the future. After World War II, Wilkes responded again to a community need, growing and transforming itself into a four-year college to aid in the massive task of preparing returning veterans for challenging and rewarding careers. More recently, as a part of the region's economic and cultural re-birth, Wilkes has developed into a comprehensive university, offering a broad range of bachelor's and master's degree programs, thus continuing the institution's tradition of service to the community through educational programs of high quality and direct relevance to the area's development.

Academic Excellence With Human Understanding

Wilkes' mission has been shaped in fundamental ways by the unique perspective on education of Eugene Shedden Farley, Wilkes' president for more than thirty-five years, who possessed a distinctive vision of higher education — a vision articulated in his collected works, *Essays of an Educator.* Dr. Farley advocated a rigorous academic program which would require students to meet high standards and enable them to compete successfully in leading graduate and professional schools. Moreover, Dr. Farley's Quaker background led him to place equally strong emphasis on education's role in cultivating individual integrity, personal responsibility, and sensitivity to the beliefs and customs of persons from diverse cultural backgrounds. Wilkes' tradition of seeking an ethnically and religiously diverse faculty and student body and ensuring that campus clubs and associations welcome all students as members can be traced to Dr. Farley's guidance of the College in its formative years. The only independent, non-denominational, four-year college in the region, Wilkes played a special role in building a close-knit campus community composed of persons from a wide variety of traditions and points of view. As a result, academic excellence and a campus environment of tolerance of diversity have come to be strong components of the Wilkes tradition.

Institutional Role and Identity

Wilkes University defines itself as an independent, nondenominational institution at which students can combine a liberal arts and sciences education

with professional preparation. Wilkes offers majors in the traditional disciplines of the humanities, social sciences, and natural and physical sciences. In addition, the University has developed strong professional programs in accounting, business, communications, education, engineering, music, nursing, and theatre arts. Wilkes brings together qualified students and a dedicated faculty and staff in a supportive atmosphere that encourages each student's intellectual and personal development. The challenge of high academic standards is matched by a learning environment that provides students with the personal attention and resources needed for full educational growth. Wilkes views itself as an institution at which students with strong motivation though varying preparation for college work have the opportunity for an education of high quality which can prepare them for the challenges of a rapidly changing world and for competitive graduate and professional schools.

Wilkes has a firm commitment to a curriculum designed to help students discover and integrate the intellectual disciplines and to foster critical and creative thought, effective communication, mathematical skills, and computer literacy. Both the General Education Requirements and the total curriculum are periodically reviewed to ensure responsiveness to the important changes taking place in higher education and to support a broad but integrative educational experience. The strength of a Wilkes education is its balance of the theoretical and practical, of liberal learning and professional preparation. Students have the opportunity of applying knowledge to real problems by working in well-equipped laboratories, serving internships, and participating in cooperative education. Beyond balancing theory and practice, a Wilkes education seeks to increase students' capacity to serve others with intelligence, imagination, and integrity.

Extracurricular activities at Wilkes are central to the education of the whole person. Musical performance, athletics, radio and television broadcasting, AFROTC, student government, debate, social service organizations, drama, and a variety of clubs afford a broad range of opportunities for participation in college life. The Wilkes campus, located in the historic district of downtown Wilkes-Barre, brings together residential and commuting students in an atmosphere that promotes their full social and personal development.

A vital part of the mission of Wilkes University is service to Northeastern Pennsylvania. Wilkes has encouraged the fine arts and the performing arts through the Sordoni Art Gallery, the Dorothy Dickson Darte Center for the Performing Arts, and the cultural events that the University regularly sponsors. The Eugene Shedden Farley Library serves as a comprehensive information and resource center for the region. In response to the needs of business and industry, the University has become a regional center for engineering, science, and technology. The University also responds to the needs

of part-time students by making most of its degree programs available to the nontraditional student through evening and weekend courses. In addition, a growing part of the University's community service is the program for continuing education, which provides courses for learners of all ages.

Building upon solid undergraduate programs, Wilkes also provides an important service by offering graduate degrees for students who wish to acquire advanced education in specific professional fields. Most of the graduate programs at Wilkes are multidisciplinary. The teachers of the region are served by master's degrees in education and in the humanities, social sciences, and sciences. Master's degrees in business administration, electrical engineering, nursing, and health care administration are designed to prepare students for professional advancement.

Mission: Education and Service for a Dynamic Future

While a cherished tradition and a sense of institutional identity may provide inspiration and suggest broad guidelines, the question of institutional mission must be continually examined in light of developments in society and technology. Specifically, Wilkes must strive to identify goals and conduct programs which will be of value to its students and the community in the social and technological environment of the future.

Society will continue to be in a state of constant, transforming change in response to new information, technological advances, and unanticipated developments. A society characterized by extensive change demands education which prepares individuals and communities to be flexible and adaptive, ready to benefit from innovation. In particular, those in leadership positions must be educated to manage successive waves of change and to channel those changes productively. Wilkes' overarching imperative must be to educate its students and help the surrounding community to flourish in a setting of technological and societal dynamism.

Goals

Baccalaureate Programs

A variety of carefully structured undergraduate educational programs derive from Wilkes' primary purpose. Each degree program is designed to achieve particular educational objectives; however, all baccalaureate programs share a set of distinctive goals which define the Wilkes approach to baccalaureate education. They include:

1. **A commitment to high standards of academic achievement and, thereby, to the integrity of the baccalaureate degree.**

   Wilkes offers programs of undergraduate studies that attract students who approach college primarily as an opportunity for intellectual growth and development. Course requirements are demanding and instructors' expectations of students are high. The result is an educational setting which, while supportive of students and sensitive to their individual needs, ultimately requires strong academic performance for program completion.

2. **Completion of an extensive set of General Education Requirements in the fundamental fields of the arts and sciences.**

The General Education Requirements are designed to develop:

— proficiency in written and oral communication;

— facility in employing quantitative and other problem-solving methods;

— sensitivity to ethical issues;

— capacity to analyze issues critically and reach independent judgments regarding them;

— understanding of the uses and challenges of science and technology;

— appreciation of the arts and their societal roles;

— knowledge of the history and contemporary functioning in the American setting of social and political institutions;

— acquaintance with diverse perspectives on human nature and behavior; and

— a sense of the cohesion of all knowledge and human understanding.

3. **An instructional approach which defines the student as an active participant rather than a passive observer in the classroom, laboratory, and other learning settings.**

Education is viewed as much more than the transfer of information from instructors to students. Emphasis is placed on interactive instructional approaches, which provide opportunities for students to engage in a dialog with their instructors and fellow students and to become actively involved in the quest for and application of knowledge. The student is not a spectator but a primary actor in the educational process; the instructor's role is to assist in discovering, drawing out, and developing the student's capabilities. Students also develop initiative and leadership through a full program of extra curricular activities.

4. **Curricular and programmatic features which help students integrate theoretical understanding with the application of knowledge in professional and community settings.**

Students are expected to learn from experience through case studies, simulation exercises, experiential learning programs, and participation in the initiatives their professors undertake to apply knowledge through outreach activities.

5. **An approach to curriculum which emphasizes principles, ideas, and analytical procedures that cut across and transcend the boundaries of particular disciplines and facilitate life-long learning.**

Through interdisciplinary courses as well as projects or papers which require the synthesis of knowledge, students are encouraged to generalize and to develop skills that will enable them to continue learning throughout their lives, in their own as well as other fields of knowledge. A rapidly changing society places a premium on adaptability and breadth of knowledge, fostered by a grasp of fundamental principles rather than by narrow specialization in current practices. To prepare competent individuals for the future, Wilkes focuses on cultivating individuals who are well equipped to adapt to change.

6. **Careful, personalized academic and career advisement to ensure that students pursue coherent programs of study and devote appropriate attention to planning for the transition from college to a career or graduate study.**

At Wilkes, the responsibility of a college educator is defined as extending beyond the classroom to include support for each student's formulation of long-range goals. The advisor-advisee relationship focuses on personal strategic planning for the student's future, integrating curricular decisions with the student's post-graduation objectives.

7. **Maintenance of an academic environment which is free from *a priori* commitments to particular ideologies or creeds.**

Wilkes represents an important component of the rich diversity of American higher education — the independent, non-sectarian institution. While supportive of the moral, ethical, and religious development of its students, Wilkes does not subscribe to a particular denominational creed.

Protection of the independence of the faculty and the curriculum from governmental prescription and the preservation of private sector initiative in higher education are fundamental commitments of the institution.

8. **Articulation and pursuit of the highest standards of personal integrity and professional responsibility.**

Students, faculty, and staff constitute a community of learning whose members share responsibility for maintaining rules which promote honesty, self-discipline, and the common good, proscribing cheating, plagiarism, or other forms of misrepresentation.

Graduate Programs

In the last decade, Wilkes has increased substantially its engagement in graduate programs at the master's degree level in the arts and sciences as well as professional fields. Emphasis has been placed on programs that are responsive to student needs for career advancement and the institution's role in applied research and outreach to the region. The graduate program, viewed as a whole, has the following defining and distinctive goals:

1. A focus on programs designed for persons who are seeking personal growth, career advancement, and professional development.
2. Concentration on graduate degree programs intended to advance the economic and cultural development of the region.
3. Engagement in outreach programs which link external organizations with campus academic life and provide opportunities for applied research to graduate students and faculty members.
4. A multi-disciplinary approach to graduate studies, emphasizing breadth and adaptability to changing professional and societal conditions.
5. The development of carefully structured cooperative agreements, which provide for the offering of other institutions' programs on the Wilkes campus and the offering of Wilkes' programs on other campuses in the region.
6. Concentration on graduate programs in fields which are already strong in terms of faculty, facilities, and library resources at the undergraduate level and which will be augmented by graduate level offerings.

Wilkes envisions an expanding role in graduate education; however, the primary focus of the institution will remain on excellence in undergraduate studies.

Continuing Education and Cultural Affairs

A variety of non-credit courses, exhibits, workshops, and performances are provided to enhance community life and to help individuals attain career goals. The Sordoni Art Gallery brings programming in the fine arts to both the campus and the Wilkes-Barre area. Throughout the year, music and theater programs offer concerts and dramatic productions at the Dorothy Dickson Darte Center for the Performing Arts. Continuing education courses are offered for personal educational enrichment as well as for the preparation of new entrants to the job market and the in-service training of established professionals.

Accreditation

Wilkes University offers degrees and programs approved by the Department of Education of the Commonwealth of Pennsylvania and accredited by the Commission on Higher Education of the Middle States Association of Colleges and Secondary Schools. Certain academic programs are also individually accredited by appropriate professional organizations. The Chemistry curriculum is approved by the American Chemical Society. The Electrical and Materials Engineering programs are accredited by the Accreditation Board for Engineering and Technology (ABET). The baccalaureate program in Nursing is approved by the Pennsylvania State Board of Nurse Examiners and is accredited by The National League for Nursing.

Buildings and Facilities

The **E. S. Farley Library,** named for Wilkes' first president, exists to provide its users with effective access to recorded information. The Library has acquired a substantial collection of carefully selected materials in a variety of formats and media, including more than 200,000 volumes, 1,100 current journal and newspaper subscriptions, and over 600,000 microforms. Particular subject strengths include English literature, American cultural history, and the history of science. The Farley Library's automated catalog system enables users to search the various collections at Wilkes (books, journals, and audiovisual materials) by author, title, subject and keyword on public access terminals. Online database searching is available to students and faculty through the Reference Department of the Library. Special facilities include a microcomputer lab, special collections rooms, audio/visual resources and microform equipment. Library collections are supplemented by cooperative arrangements with other libraries. Through a variety of printed and online sources, the Library is able to identify and locate virtually any published materials needed by library users.

The **Dorothy Dickson Darte Center for the Performing Arts** features a fully-equipped, 500-seat theater on a site donated by the Wyoming Valley Society of Arts and Sciences. The Center's facilities include a scene shop, dressing rooms, rehearsal areas, costume rooms, hydraulic lift forestage, patch panel with 246 circuits, and a 10-scene preset with 60 dimmers. The facility is well-equipped for instructional use and regularly used for university and community presentations.

The **Dorothy Dickson Darte Music Building** opened in the summer of 1969 as the second phase of the Center for the Performing Arts. It houses faculty offices, studios, classrooms, practice and rehearsal rooms, and it is the centerpiece for the University's highly regarded music programs. Concerts and recitals are regularly presented in Gies Recital Hall and are open to the public.

The **Sordoni Art Gallery,** given to Wilkes in 1973 by The Andrew J. Sordoni Foundation, Inc. is located in Stark Learning Center. The main purpose of this modern facility is to present art exhibitions to enrich campus and community life. Exhibitions are supplemented by lectures, tours, demonstrations, and related arts programs. A growing permanent collection embraces all media but is particularly strong in nineteenth and twentieth century American and European paintings. The print collection includes works of the old masters as well as contemporary artists. The Gallery is a particularly valuable study facility for students.

Stark Learning Center, named in honor of the late Admiral Harold R. Stark, Honorary Chairman of the Board of Trustees, opened in 1958 and was expanded in 1973. Stark Learning Center is the major instructional facility on campus, and it provides approximately 85,000 square feet of modern classroom, laboratory, studio and office space.

The **Allan P. Kirby Center for Free Enterprise and Entrepreneurship** was established in 1993 through a generous gift from Mr. Allan P. Kirby, Jr., a member of the Wilkes Board of Trustees, in honor of his father. Housed at 65 South Street on the Wilkes campus, the Center is the residence of the Allan P. Kirby, Jr., Distinguished Professor of Free Enterprise and Entrepreneurship. The Kirby Professor will direct the Center's activities, fostering and promoting economic individualism and independence within the context of the free enterprise system. A variety of projects, including grants, conferences and special seminars, are sponsored by the Center.

Academic Computing Facilities include a campus-wide computer network which connects the main academic IBM RS/6000 minicomputer and subnet servers located in the Electrical and Computer Engineering Department, the GeoEnvironmental Sciences and Engineering Department, the Mathematics and Computer Science Department, and the Mechanical and Materials Engineering Department as well as the University's connection to

the Internet. Microcomputer facilities include: the Computer-Aided Design Laboratory; the Regional Computer Resource Center Macintosh Laboratory, MS-DOS Laboratory and Apple Laboratory; the Computer-Aided Engineering Laboratory; the Computer/Simulation Laboratory; the Math/Computer Science Department's IBM PC Laboratory; the School of Business, Society and Public Policy's MS-DOS Laboratory; the English Department's Writing Center and Writing Center Computer Classroom; the Communications Department's MS-DOS Writing Laboratory; and the Art Department's Graphics Laboratory.

The **Conyngham Student Center,** refurbished by the Conyngham family and friends, is a multi-functional unit available to individual students and student organizations for activities and relaxation. It includes a snack bar and game room and provides a pleasant meeting place for students and faculty alike. It also houses the offices of the Deans of Student Affairs, the Dean of Academic Support Services as well as the Office of Evening, Summer and Keystone Weekend Programs.

The **Arnaud C. Marts Sports and Conference Center,** named in honor of the person most responsible for the founding and nurturing of Wilkes University, opened in 1989. The three-story, 75,000-square-foot building on South Franklin Street features the new 3,500-seat Henry gymnasium, as well as dedicated space for health facilities, physical education classes, faculty offices, intramural and intercollegiate sports, and the offices of the Athletic Director and the Associate Director of Athletics. The Henry gymnasium is the indoor site for the three annual Commencement exercises held each August, January and May. In addition, the Marts Center provides pleasant conference facilities and classrooms. Dr. Marts, while serving as president of Bucknell University, made the decision to establish a branch campus of Bucknell in Wilkes-Barre.

The University's **Residence Halls** house 800 students in a variety of living arrangements in facilities ranging from stately Victorian and Tudor mansions to the ultra-modern accommodations of Evans Hall. Each residence hall is staffed by graduate or undergraduate Resident Assistants, who provide guidance and supervision and assist in the development of a constructive learning environment. Residence hall space is available to all full-time undergraduate students. All full-time undergraduates of freshman or sophomore standing who do not commute from the home of a parent or legal guardian **must** reside on campus. Exceptions to this policy may be granted only by the Residence Life Office or the Office of the Dean of Student Affairs. Any student who is not 18 years of age and does not reside at the home of a parent or guardian must live on campus. Detailed information regarding residence halls and residence life can be obtained from the Office of Admissions or the Residence Life Office.

Admissions

Admission Requirements
Admission Procedures
Advanced Placement

Admission

Required High School Preparation

A student's secondary school preparation should include a college preparatory curriculum with four years of English, three years of mathematics, two years of a foreign language, two years of science (including a laboratory component), three years of social studies and, if available, introduction to computing. Additional courses should be elected in academic subjects according to individual interests. Students whose preparation has not followed this pattern may still qualify for admission if there is other strong evidence that they are prepared for college work.

Students intending to major in Biology, Chemistry, Computer Science, Engineering, Mathematics, Medical Technology, or Physics should have at least three years of college preparatory mathematics courses (including algebra II, geometry, and topics in trigonometry) to be prepared to take Mth 105 or 111 (calculus) in the first term of the freshman year. The student without such background is advised to take, preferably in the summer preceding entrance, Mth 100 (algebra and trigonometry) offered at Wilkes or an equivalent course at another college or university. Credits in such remedial courses will not exempt the student from any required course in these programs.

Students majoring in Nursing are required to have completed courses in English (four units), Social Studies (three units), Mathematics (two units including algebra), and Science (two units including biology and chemistry) during their secondary school programs.

Application for Admission

Applications for admission and instructions regarding secondary school records, recommendations, and entrance examinations may be obtained from the Office of Admissions. The completed applications should be returned directly to the Admissions Office with a non-refundable $30 application fee.

Admissions Tests

The Scholastic Aptitude Test (SAT) of the College Entrance Examination Board or the Achievement College Test (ACT) is required of all applicants. Students should plan to take this examination in the fall term of their senior year, although many applicants take the exam in their junior year. Wilkes is a member of the College Entrance Examination Board.

Students communicating with the Educational Testing Center in Princeton, New Jersey, or in Los Angeles, California, should refer to the Wilkes University code number 2977.

Acceptance of Admission and Deposit

After receipt of the secondary school record, the secondary school recommendations, and the SAT or ACT scores, the Admissions Office acts upon all applications. Notification of action is sent immediately. Resident students should guarantee their place in the entering class by forwarding a $300 tuition and residence hall deposit to the Office of Admissions by May 1. Commuting students are required to forward a $200 tuition deposit to the Admissions Office by May 1 to secure their place. (Fees applicable for Fall Semester, 1994.)

Applicants for the degree programs in music and theater are required to audition for, and interview with, the department faculty. Prospective art majors must schedule a portfolio review with the Department of Art.

The University accepts a limited number of applications for the spring semester. Procedures are similar to those followed in the fall semester.

Campus Visits

Although a personal interview with each student is not required, an interview is strongly recommended. Students and their families are encouraged to call or write for an appointment so that the admissions staff is available to meet with them when they visit the campus.

A number of campus visitation days are held during the academic year. Visitation days include a general meeting with the admissions staff, current students, and administrative personnel; a tour of the campus; a light lunch; and meetings with faculty from the academic departments. Specific information about and the dates of the visitation days are available upon request from the Office of Admissions.

Admission of International Students

In order to be considered for admission to Wilkes University, international students must submit the following: completed application, official results of the TOEFL (Test of English as a Foreign Language) or evidence of the successful completion of an accredited intensive English language program, Declaration of Finances Form (which may be obtained from the Wilkes University Office of Admissions), official transcripts of all secondary and/or post-secondary work completed to date, and a copy of the secondary and/or post-secondary diploma or leaving certificate.

Students should apply by June 15 for the fall semester or November 15 for the spring semester.

The form I-20 is issued only when the application is complete and the candidate is judged to be admissible.

Admission of Transfer Students

The University welcomes transfer students from other accredited colleges and universities for both the fall and spring semesters. Transfer students must submit a formal application, a high school transcript, a transcript from each post-secondary institution attended, and their SAT or ACT scores if they have earned fewer than 30 credits. Applicants must be in good academic standing with a minimum grade point average of 2.00 (C) at the beginning of the semester they first enroll at Wilkes. All courses with a grade of 2.00 (C) or better that are comparable to the curriculum at Wilkes will be accepted for transfer. Students transferring into the nursing program must arrange their schedule and register **after** consultation with the Chairperson of the Department of Nursing.

All transfer students must complete a minimum of 30 credits (exclusive of advanced placement credit awarded by Wilkes) and a minimum of one-half of their major field credits at Wilkes University.

All transfer students must also complete the University's General Education Requirements. Transfer students who enter Wilkes with 60 or more credits will satisfy the Writing Intensive requirement of the General Education Requirements by completing two courses designated as Writing Intensive. See pages 48-50 of this Bulletin for an explanation of the University's General Education Requirements.

Transfer students from two-year institutions must complete a minimum of 60 credits at baccalaureate degree-granting institutions.

Grades earned in courses accepted for transfer are **not** included in the computation of the cumulative grade point average earned at Wilkes University.

Transfer students should consult the Graduation Requirements on page 60 of this Bulletin for institution-wide graduation requirements.

University policy prohibits the Office of Admissions from admitting any student who has been dismissed from any other college or university until a period of one year has elapsed from the time of dismissal. Students who have been placed on probation by another college or university will be considered for admission on a case by case basis.

Readmission to the University

Students who have been enrolled full-time at the University and have terminated their studies but wish to return as full-time students must contact the Registrar's Office and meet with one of the deans in the Student Affairs Office as the first step in the readmission process.

Admission of Part-time Students

Those who wish to enroll as part-time students should contact the Office of Evening, Summer, and Weekend Programs to discuss their plans and to obtain an Application for Admission. Students who have completed college-level work at another institution must submit an official transcript of their work as part of the admission process. Those who have completed no college work should arrange to have an official high school transcript forwarded in support of their application. All documentation should be sent to the Evening, Summer, and Weekend Office.

Part-time to Full-time

Part-time students who wish to enroll as full-time students must consult with the Director of Evening, Summer, and Weekend Programs as the first step in this process. Students who have completed 30 or more credits and have maintained a grade point average of 2.00 will be accepted as full-time students. Students who have completed fewer than 30 credits will be required to provide high school transcripts and appropriate test scores in support of their petition to enroll full-time, **before** a decision will be made.

Advanced Placement Credit

Wilkes University encourages students to work to their full capacity and to advance as rapidly as appropriate in their academic work. A number of opportunities are open to qualified high school juniors and seniors, as well as to adults returning to school after an interval of work or military experience, to demonstrate competence beyond that normally associated with graduation from high school. Academic credit may be granted for such demonstrated competence through a variety of channels.

Advanced Placement Program

Students who have successfully passed one or more of the Advanced Placement Tests administered by the College Entrance Examination Board may request advanced placement and/or academic credits. Advanced Placement means that the student may be scheduled for a course at a more advanced level; a decision on advanced placement is made after review of the examination by the academic department concerned. Credit means that the student receives credit toward the hours required for graduation. Generally, credit will be granted for scores of 3, 4, or 5. Occasionally, a personal interview may be required before placement and/or credit is awarded. No grades are assigned to the courses for which the student receives advanced placement credit. Information on specific course examinations and credit may be obtained from the Office of Admissions.

Credit for Military Experience

Students who have completed the special educational programs offered by branches of the American armed services may be granted academic credit for this course-work. Such students should submit an official transcript of their work as part of the admissions process. Transcripts will be evaluated according to the guidelines provided by the American Council on Education, and credits granted will be applied to the degree program as appropriate. For more information on this program, contact the Office of Admissions.

Challenge Examinations

After admission to Wilkes University, a student may wish to take an examination demonstrating competence in a particular course. The interested student should apply to the appropriate department chairperson for permission to take a challenge examination. The chairperson will approve the student's application in writing only on the basis of a judgment that the student has adequate background in the field. If denied a challenge examination, the student may appeal to the appropriate school dean. The student may not challenge a course that he/she has failed.

A fee of $35 per credit will be assessed by the Financial Management Office for each approved challenge examination. The student must present a receipt to the department chairperson at least thirty days before the examination will be administered. Credit for the course is given and a grade of P recorded if the student passes the examination. No grade or credit is recorded if the student fails the examination.

RN – Validation of Prior Learning

Registered nurse students and students who are eligible to sit for NCLEX-RN may validate prior learning by successfully completing the Mosby Assess Test (Secured Version). Upon successful completion of this examination and Nursing 299, the student will receive credit for Nursing 202, 203 and 204. Registered nurses should contact the Department of Nursing for more information on this program.

College-Level Examination Program

The University grants credits on the basis of satisfactory performance on the Subject Examinations, **not** the General Examinations, of the College-Level Examination Program (CLEP) administered by the College Entrance Examination Board. CLEP credits from an accredited institution are transferable to the University. Although the program is designed primarily for adults, exceptionally well qualified high school seniors may find it advantageous to seek academic credit through the CLEP. Inquiries about CLEP should be addressed to the Office of Evening, Summer, and Weekend Programs. Official scores on CLEP Subject Examinations should be forwarded directly to the Office of Evening, Summer, and Weekend Programs for evaluation.

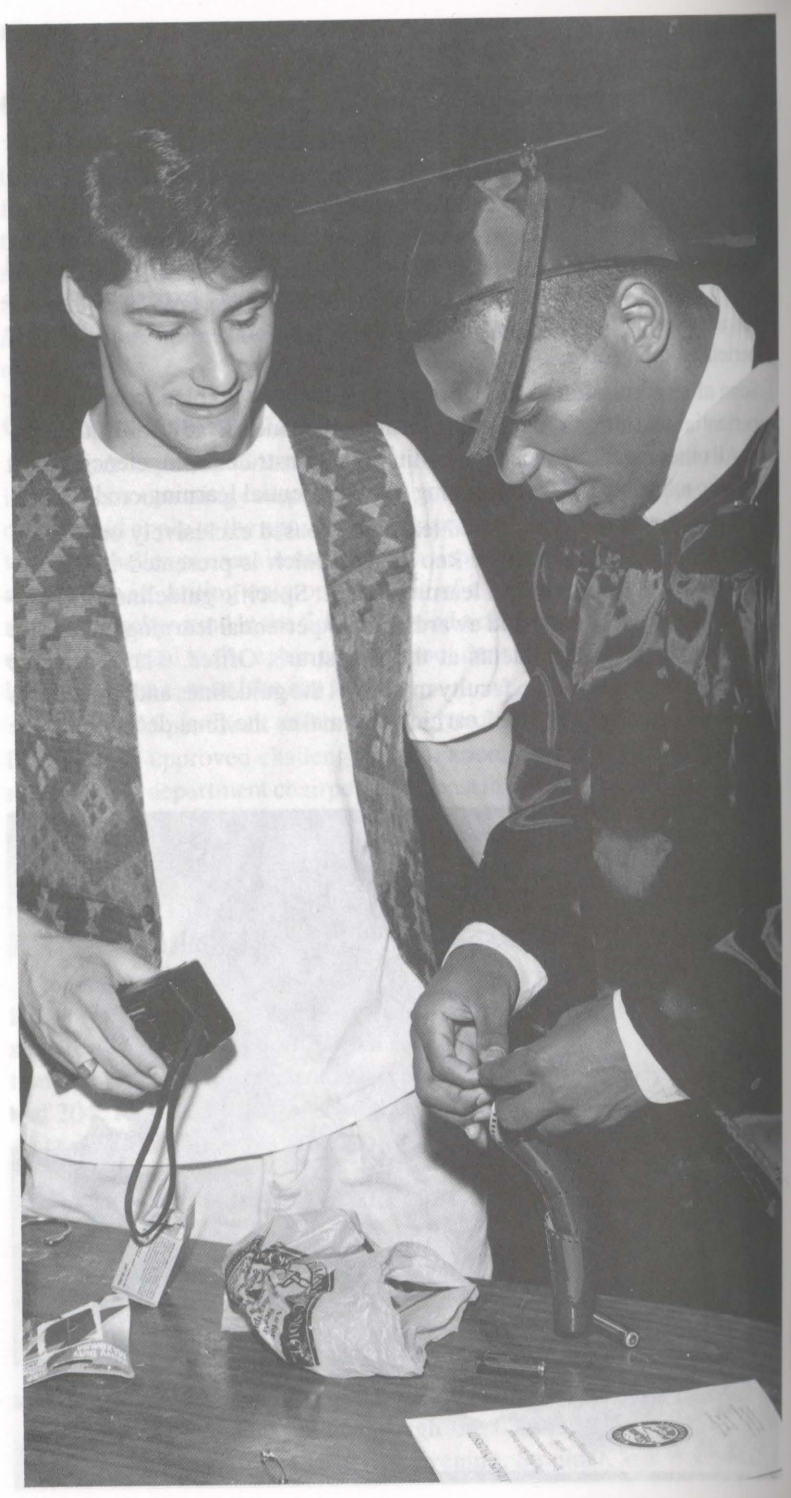
Experiential Learning

Credit for life experience may be granted for documented college-level learning that a student acquires through non-collegiate experiences. This credit is awarded for the learning derived from life experiences, **not** for the experiences themselves.

Soon after admission to the University, students who plan to petition for experiential learning credit must inform their academic advisor of their intent. All other means of securing credit for demonstrated competencies must have been exhausted before applying for experiential learning credit.

Credit awarded for experiential learning is based exclusively on Wilkes' evaluation of the demonstrated knowledge which is presented in the student's petition for experiential learning credit. Specific guidelines and procedures for the petitioning and awarding of experiential learning credits are available to interested students at the Registrar's Office. The Academic Standards Committee of the faculty maintains the guidelines and procedures of the Policy on Experiential Learning and makes the final decision on the awarding of credit.





Expenses and Financial Assistance

Tuition and Fees
Payment Options
Financial Aid
Application Procedures
Types of Financial Assistance

Student Expenses

The following chart summarizes student expenses for the 1994-95 academic year which offically begins with the Fall Semester, 1994. Students are referred to the course descriptions in this Bulletin for laboratory and other fees associated with particular courses. Inquiries about particular charges should be addressed to the Financial Management Office.

Student Expenses for 1994-95

Full-time Undergraduate:	**Assessment**	**Each Semester**	**Total for Year**
*Tuition (12-18 Credits)	Per Semester	$ 5,575	$11,150
Room:			
in Rifkin Hall	Per Semester	$ 1,775	$ 3,550
in Other Residence Halls	Per Semester	$ 1,550	$ 3,100
Board			
19 Meal Plan	Per Semester	$ 1,015	$ 2,030
14 Meal Plan	Per Semester	$ 940	$ 1,880
Commuters Only			
9 Meal Plan	Per Semester	$ 535	$ 1,070
5 Meal Plan	Per Semester	$ 320	$ 640
Room Damage Deposit	One Time	—	$ 50
General University Fee	Per Semester	$167.50	$ 335
Activity Fee	Per Semester	$ 41.50	$ 83

*Credits above 18 will be assessed at the rate of $310 per credit hour.

Part-time Undergraduate:			
Tuition (1-11 1/2 credits)	Per Credit	$ 310	–
General University Fee	Per Credit	$ 6	–
Summer Sessions — Undergraduate:			
Tuition	Per Credit	$ 290	–
General University Fee	Per Credit	$ 5	–
Summer Board	Per Week	$ 85	–
Summer Room	Per Week	$ 85	–
Room Damage Deposit	One Time	$ 50	–
Other Fees and Charges:			
Acceptance Deposit:			
Residence Hall	One Time	$ 100	–
Tuition	One Time	$ 200	–
Application Fee	One Time	$ 30	–
Applied Music Fees:			
1/2 hour private lesson		$ 255	–
1 hour private lesson		$ 510	–
Audit Fee (Undergraduate Courses):			
Full-time Undergraduate Students	No Tuition Charge	—	–
Graduate and Part-time Undergraduate Students	Per Credit	$ 155	–

Other Fees and Charges:	**Assessment**	**Each Semester**	**Total for Year**
Challenge Exam	Per Credit	$ 35	—
Graduation Fee	One Time	$ 120*	—
Late Registration Fee	Per Semester	$ 25	—
Medical Technology Fee (During Clinical Training)	Per Semester	$ 650*	$ 1,300
Music Major Fee	Per Semester	$ 25	$ 50
New Student Orientation Fee	One Time	$ 85	—
Nurses Professional Liability Insurance	Per Year	—	$ 15
Replacement of Lost ID cards	Each	$ 10	—
Returned Check Charge	Each	$ 20	—

*Effective with Summer, 1994.

Students are advised to request a refund of credit balances in their accounts should they desire a refund.



Payment of Charges

Prior to the beginning of each semester, invoices listing all current semester charges and approved financial aid are mailed to all registered students. All payments are made directly to Wilkes University, P.O. Box 2834, Wilkes-Barre, PA 18701-2834. Questions concerning charges or payments should be directed to the Coordinator of Student Accounts in the Financial Management Office.

Students who fail to pay all indebtedness to the University shall not be permitted to receive any degree, certificate, or transcript of grades. Nor shall they participate in Commencement activities.

Fall and Spring Full-time Tuition

The unfunded cost of full-time tuition and fees will be paid or satisfactory arrangements made with the Director, Financial Management, or his designee two weeks before the day on which classes begin. Unfunded costs are defined as the total of all appropriate charges for tuition, fees, room and board, etc., less the total of all approved financial aid awarded or credited to the student account for each semester or other instructional period. Satisfactory arrangements are defined as:

a. Enrollment in the Monthly Payment Option plan (discussed below);
b. Participation in the deferred employer reimbursement plan;
c. Enrollment in one of the third-party, sponsored tuition coverage plans (ROTC Scholarship, Bureau of Vocational Rehabilitation, Office of the Blind, etc.).

If payment in full or satisfactory arrangements are not made two weeks before the first day of class each semester, the registration for that semester will be cancelled and the student will not be allowed to attend classes. In order to be reenrolled and reregistered, the student will be required to pay a late registration fee of $25 in cash before registering. Students whose accounts are three payments late will be cancelled from the monthly payment option plan and the full unpaid amount will immediately become due and payable. All students who fall into this category and those students who have been written off as bad debts or have been turned over to a collection agency will not be eligible for consideration of any other alternative financial arrangements.

Students who have applied for a Stafford Loan (Guaranteed Student Loan) where approval has not been granted by the bank will be required to pay the lesser of $300 or 25% of the loan requested two weeks before the first day on which classes begin. If the Stafford Loan (Guaranteed Student Loan) is subsequently approved, refunds of overpayments will then be made after the loan check is posted to the student's account.

All financial arrangements are to be processed by the Director, Financial Management, or his designee and approved by the Vice President, Business Affairs/Auxiliary Enterprises or his designee. No other University officer or employee will be permitted to negotiate financial arrangements for the settlement of student accounts.

Summer, Fall and Spring Part-time Tuition

Charges for summer and/or part-time tuition and fees must be paid in full two weeks before the first day of classes unless covered by the deferred employer reimbursement policy. The deferred payment policy is described below.

Intersession Tuition

Tuition charges for intersession semesters must be paid in full two weeks before the first day of class. The deferred payment option does **not** apply to intersession charges.

Deferred Payment Policy (Employer Reimbursed)

Deferred payments for employer reimbursement and third party payor arrangements will be permitted, provided the student makes application and receives approval and delivers the completed documents two full weeks before classes begin. Graduating seniors are **not** eligible for the deferred payment option.

Monthly Payments

Wilkes has developed an interest-free, ten-month, installment payment plan (IPP) to help ease the burden of financing an education. Arrangements may be made to finance any amount between $300 and the total unfunded cost of tuition and fees. Payments begin in June and end in March of each academic year. IPP applications for the upcoming academic year are available in April of each year. There is a $50 annual application fee. For more information write to Academic Management Services, 50 Vision Boulevard, East Providence, RI 02914, or call 1-800-635-0120.

Two additional extended payment plans are available through the Knight Insurance Company. The **Extended Repayment Plan** allows the parent to spread the cost of college over a 10-year period. Shorter repayment terms are available for plans covering 1, 2, or 3 years of education. With **ABLE** (A Better Loan for Education), families may spread one year of college costs over 15 years with a low monthly payment. Loans for 2 to 4 years are available with the same 15-year repayment term. Parents may use these programs to cover all or part of the costs of education at Wilkes University and can select the annual amount and the number of years of education to finance. For further information, including application procedures, write or call the Knight Tuition Payment Plans, 855 Boylston Street, Boston MA 02116-2611. Telephone 1-800-225-6783.

VISA/MasterCard

Wilkes University accepts VISA and MasterCard for tuition and fee payments.

Tuition Discounts

Various tuition discounts are available to Wilkes students who meet eligibility requirements. For application procedures, contact the Financial Aid Office.

Alumni Discount: Alumni qualify for a 10% discount on tuition for undergraduate and graduate courses. A written request for this discount should be submitted to the Financial Aid Office at the time of registration.

Alumni Dependent Discount: A 10% tuition discount is given to the spouse and children of Wilkes University alumni. The discount extends throughout the student's **undergraduate** year as long as the student meets the institution's academic standards policy and is enrolled on a full-time basis.

Evening Student Discount: Certain full-time, evening-school students who are also employed full-time may qualify for this discount.

Multiple Student Discount: When two or more members of the same family attend Wilkes at the same time on a full-time basis, a 15% reduction in net tuition is given to all but the first family member.

Patrolman's Benevolent Association Discount: A 15% tuition discount is provided for children of members of New York's Patrolman's Benevolent Association. An additional 5% is provided for students who graduated in the top 5% of their high school class.

Tuition Exchange

Wilkes University is a member of the Tuition Exchange Plan which provides limited opportunities for faculty children from one college or university to enjoy tuition remission benefits at another institution. Students who are dependents of faculty and administration should consult the Tuition Exchange Liaison Officer at their home institutions to determine if they qualify for this program.

Refunds

Students who officially withdraw from courses may be eligible for a partial refund of tuition charges. Resident students who withdraw from the University may also qualify for a refund of meal charges. Refunds are based on the official date of withdrawal as noted by the Registrar.

Any reduction in charges may affect financial aid received for that semester. (See Refund of Financial Aid in the **Consumer's Guide to Financial Aid, Costs, and Charges at Wilkes University**, which is available at the Financial Aid Office.)

Students suspended from the University for disciplinary reasons will forfeit all refunds.

Refunds are available as indicated on the following chart:

Refund Schedule*

Circumstance	Time of Withdrawal	Refund
Academic Year:		
Tuition:	The University will cancel 100 percent of the tuition charges, less a deposit of $100, if *written* notice of cancellation is received by the Registrar on or before the first day of classes. Failure to submit proper written notification will result in the assessment of full charges. Policy guidelines for refunds processed after the first day of classes are as follows:	
Total Withdrawal	First Two Weeks	80%
	Third & Fourth Weeks	60%
	Fifth Week	40%
	After Fifth Week	No refund
Full-time to Part-time and Reduction of Part-time Load	Above time-schedule applies for courses dropped	Charges based on the number of credits after the withdrawal
Room and Board: Room	The institution will refund housing rental charges, less a deposit of $100.00, so long as written notification of cancellation is made to the Director, Residence Life Office, on or before the first day of classes of the fall semester. After the first day of classes, no refund on room charges will be allowed.	
Board	The institution will refund board charges in full, if written notification of cancellation is made to the Director, Residence Life Office, on or before the first day of classes each semester. Subsequent board charges will be refunded on a pro rata basis, less a withdrawal fee of $100.00	
Summer Sessions	First week of First or Second Sessions and first two weeks of Evening Session	50%
	After stated period	No refund
Weekend College	Through second weekend	50%
	After second weekend	No refund

*Fees are non-refundable. Refunds for special sessions (i.e. sessions which do not correspond to the calendar outlined below) will be calculated by the Financial Management Office upon student request.

PLEASE NOTE: Charges for students attending their first semester will be refunded pro-rata in accordance with the 1992 Reauthorization of the Higher Education Act. For more information please read the **Consumer's Guide to Financial Aid, Costs and Charges at Wilkes University.**

Financial Aid

Wilkes University maintains an extensive program of financial assistance for its students in the form of scholarships, grants, loans, and part-time employment. To assist qualified students, the University receives substantial gifts each year from friends and alumni. These funds, combined with those furnished by the federal and state governments, are offered to students in financial aid packages. All applicants should also apply for financial assistance, both need-based and achievement-based.

Students with questions about financial aid or students seeking applications for financial aid should contact the Financial Aid Office. More detailed information regarding the financial aid programs and requirements is included in the **Consumer's Guide to Financial Aid, Costs, and Charges at Wilkes University,** which is also available at the Financial Aid Office.

Application Procedures

1. Submit the Wilkes University Application for Financial Aid to the Wilkes University Financial Aid Office.
2. Complete the Free Application for Federal Student Aid.
3. Complete the appropriate state application for financial aid.
4. Students who desire to participate in the Stafford Loan and/or the PLUS Program must also complete the appropriate loan application.

Renewal of Financial Aid

Financial aid is awarded on an annual basis; therefore, students must reapply each year. In addition to showing continued financial need, students must also meet specific academic progress requirements to qualify for renewal. These requirements are explained in detail in the **Consumer's Guide.**

Types of Financial Aid

Financial aid packages are developed for students on an individual basis and usually consist of one or more of the following types of aid.

Scholarships: Outright gift assistance that is not repayable by the recipient and is usually based on factors other than demonstrated financial need. In addition to those scholarships listed on the chart on page 35, Wilkes University is approved to participate in the Federal Congressional Teachers' Scholarship. Also, several academic units at the University have scholarships available to qualified students. These include the School of Business, Society and Public Policy and the School of Science and Engineering as well as the Athletic Department (wrestling only); Biology Department, English Department, History Department, Music, Theater and Dance Department, Nursing Department, Political Science Department and the Sociology Department.

Grants: Outright gift assistance that is not repayable by the recipient but is based on demonstrated financial need of the applicant and the family. Many states in addition to Pennsylvania provide financial assistance in the form of grants for residents of their states. Residents of states other than Pennsylvania should contact their high school guidance office for information pertaining to that particular state's aid program. These states include Connecticut, Delaware, Maryland, Massachusetts, Ohio, Rhode Island, Vermont, and West Virginia.

Loans: Financial assistance for which the recipient assumes the obligation to repay the amount of the funds received. Most educational loans provide for payment of principal and interest to begin sometime after the student graduates or stops attending an approved institution on at least a half-time basis. Repayment of the PLUS Loan begins within a short time after funds are disbursed. Two emergency loan funds have been established at the University to help students meet small financial emergencies. The Florence and Joseph A. Goldman Loan Fund and the Robert W. Hall Student Loan Fund provide small, interest-free loans which are to be repaid at the earliest practical time, usually 30 days, so that other students may receive needed assistance from these revolving loan funds.

Employment: Financial assistance that a student may earn by working on campus in part-time or full-time positions and for which the student is paid in the form of a monthly check. Students should inquire about these opportunities at the On-Campus Employment Office. The Office of Career Services also operates a Job Location Development Program (JLD) to help students obtain employment opportunities off-campus. Students are paid by the employer for whom they work.

Veterans Assistance Programs (VA)

This special program provides a wide range of benefits to those who have served in the Armed Forces and in some cases to the dependent children of veterans. Interested persons should contact their local VA Office to obtain information concerning GI Education Assistance, Veterans Education Programs, Veterans Rehabilitation, Veteran Educational Loans, the Veteran Work-Study Program, and other sources of Veterans Assistance. The University also has a Veterans Affairs Office, located in the Marts Center, to assist students in obtaining benefits.

Financial Aid for Part-time Students

The Pell Grant, S.E.O.G., College Work-Study, Perkins Loan, Stafford Loan, and the PLUS Loan are available to part-time students. Interested students must complete the Free Application for Federal Student Aid and the appropriate loan applications in order to apply for these programs. In addition to financial need, eligibility for the Pell Grant program is based on en-

rollment status. Students registered for at least 6 credits but less than 9 credits qualify for approximately one-half of the full-time award and those registered for at least 9 credits but less than 12 credits qualify for approximately three-quarters of the full-time award. Limited funds from the Supplemental Educational Opportunity Grant (S.E.O.G.) and the Perkins Loan Programs are available to part-time students who demonstrate exceptional financial need.

Financial Aid for Students Seeking a Second Degree

Only the federal Stafford Loan and the PLUS Loan are available to students seeking a second degree. The Free Application for Federal Student Aid and the appropriate loan applications must be completed to determine eligibility for these programs.



Summary of Financial Assistance Programs*

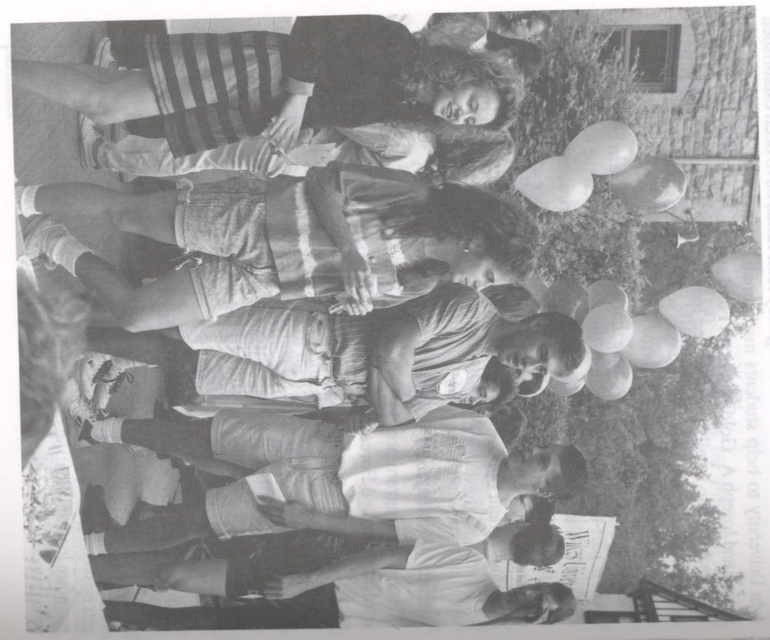
Program	Average Annual Award	Application(s) Required	Filing Deadline
		SCHOLARSHIPS	
Trustee Scholarship	$9,650	Free Application for Federal Student Aid (FAFSA) and Wilkes Financial Aid Application	Upperclass student deadline — May 1, 1994 Incoming student deadline varies — contact Wilkes Admissions Office
Presidential Scholarship	$3,180		
Achievement Scholarship	$2,083		
Multicultural Service Scholarship	$1,935		
Leadership Scholarship	$2,325		
Room & Board Scholarship	$4,588		
Wilkes Named Scholarship	$1,603		
Transfer Student Scholarship	$1,000		
ROTC Scholarship	$8,000	Contact the Wilkes ROTC Office	Contact ROTC Office
		GRANTS	
Federal Pell Grant	$1,550	Free Application for Federal Student Aid (FAFSA)	May 1, 1995
PHEAA Grant	$2,023		May 1, 1994
Federal SEOG Grant	$1,365		Upperclass student deadline — May 1, 1994
Wilkes Need-Based Grant	$2,000		Incoming student deadline — Rolling basis as long as funds are available
Wilkes Act 101 Grant	$2,723		
Office of Vocational Rehabilitation Grant	$5,517	Contact the Office of Vocational Rehabilitation	Contact Office of Vocational Rehabilitation
		LOANS	
Federal Carl Perkins Loan (NDSL)	$1,719	Free Application for Federal Student Aid (FAFSA) and Wilkes Financial Aid Application	Upperclass student deadline — May 1, 1994 Incoming student deadline — Rolling basis as long as funds are available
Federal Nursing Student Loan	$2,440		
Gulf Oil Loan	$1,909		
Rulison Evans Loan	$2,000		
Federal Stafford Loan	$3,123	Stafford Student Loan Application and Free Application for Federal Student Aid	Six to eight weeks prior to need for loan proceeds
Federal Unsub Stafford Loan	$2,302		
Federal PLUS/Supplemental Loan	$3,949	PLUS/Supplemental Loan Application	Six to eight weeks prior to need for loan proceeds
		EMPLOYMENT	
Federal College Work-Study Program	$ 800	Free Application for Federal Student Aid (FAFSA), Wilkes Financial Aid Application, and Wilkes Application for Student Employment	Prior to beginning work on campus
State Work-Study Program	$ 910	Free Application for Federal Student Aid (FAFSA), Wilkes Financial Aid Application, and SWSP Work-Study Application	Prior to beginning work on campus
Institutional Employment	$ 450	Wilkes Application for Student Employment	Prior to beginning work on campus

*Detailed information on all financial assistance programs is available in the **Consumer's Guide to Financial Aid, Costs, and Charges at Wilkes University.**

rollment status. Students registered for at least 6 credits but less than 9 credits qualify for approximately one-half of the full-time award and those registered for at least 9 credits but less than 12 credits qualify for approximately three-quarters of the full-time award. Limited funds from the Supplemental Educational Opportunity Grant (S.E.O.G.) and the Perkins Loan Programs are available to part-time students who demonstrate exceptional financial need.

Financial Aid for Students Seeking a Second Degree

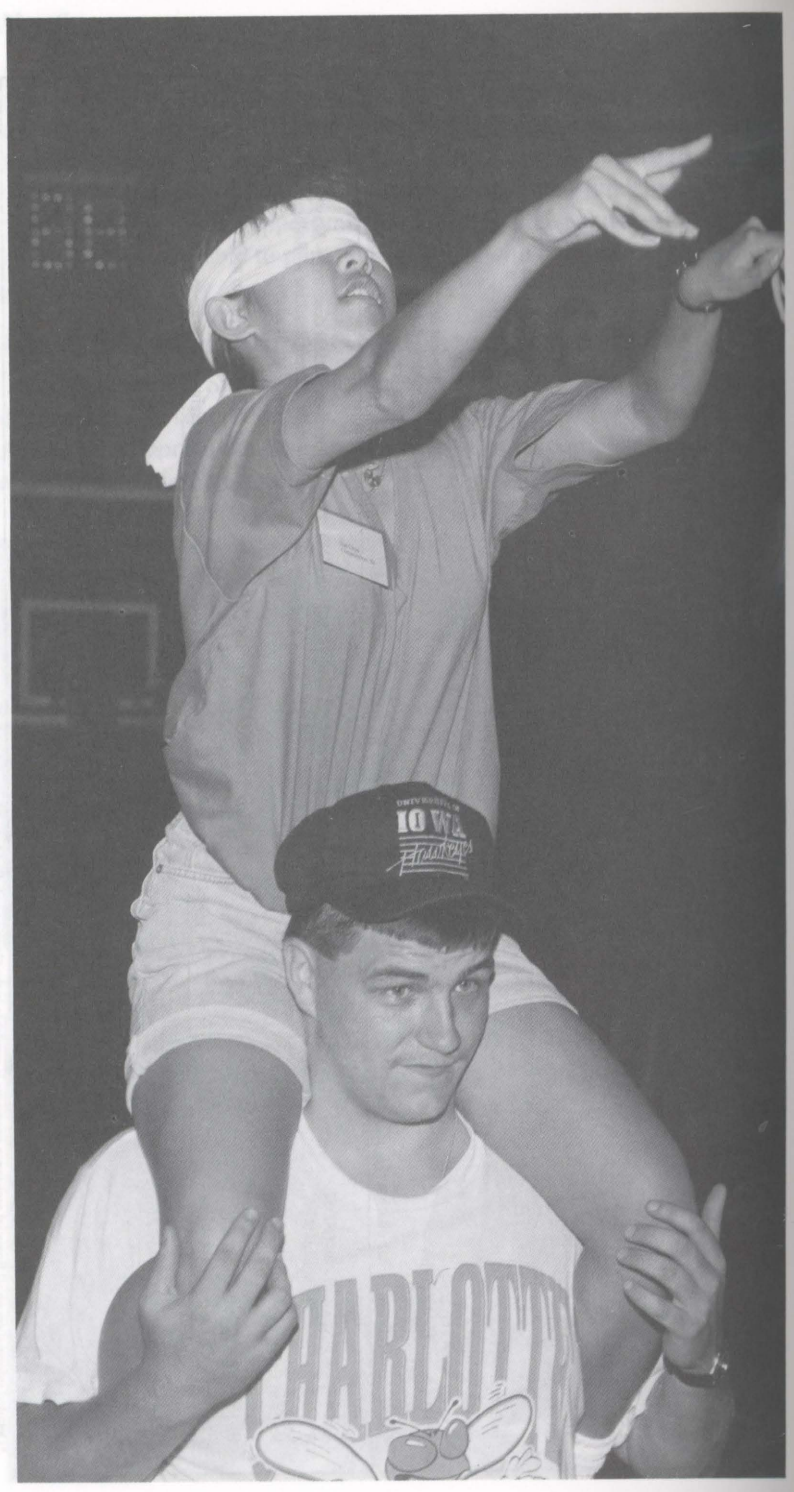
Only the federal Stafford Loan and the PLUS Loan are available to students seeking a second degree. The Free Application for Federal Student Aid and the appropriate loan applications must be completed to determine eligibility for these programs.



Summary of Financial Assistance Programs*

Program	Average Annual Award	Application(s) Required	Filing Deadline
		SCHOLARSHIPS	
Trustee Scholarship	$9,650	Free Application for Federal Student Aid (FAFSA) and Wilkes Financial Aid Application	Upperclass student deadline — May 1, 1994 Incoming student deadline varies — contact Wilkes Admissions Office
Presidential Scholarship	$3,180		
Achievement Scholarship	$2,083		
Multicultural Service Scholarship	$1,935		
Leadership Scholarship	$2,325		
Room & Board Scholarship	$4,588		
Wilkes Named Scholarship	$1,603		
Transfer Student Scholarship	$1,000		
ROTC Scholarship	$8,000	Contact the Wilkes ROTC Office	Contact ROTC Office
		GRANTS	
Federal Pell Grant	$1,550	Free Application for Federal Student Aid (FAFSA)	May 1, 1995
PHEAA Grant	$2,023		May 1, 1994
Federal SEOG Grant	$1,365		Upperclass student deadline — May 1, 1994 Incoming student deadline — Rolling basis as long as funds are available
Wilkes Need-Based Grant	$2,000		
Wilkes Act 101 Grant	$2,723		
Office of Vocational Rehabilitation Grant	$5,517	Contact the Office of Vocational Rehabilitation	Contact Office of Vocational Rehabilitation
		LOANS	
Federal Carl Perkins Loan (NDSL)	$1,719	Free Application for Federal Student Aid (FAFSA) and Wilkes Financial Aid Application	Upperclass student deadline — May 1, 1994 Incoming student deadline — Rolling basis as long as funds are available
Federal Nursing Student Loan	$2,440		
Gulf Oil Loan	$1,909		
Rulison Evans Loan	$2,000		
Federal Stafford Loan	$3,123	Stafford Student Loan Application and Free Application for Federal Student Aid	Six to eight weeks prior to need for loan proceeds
Federal Unsub Stafford Loan	$2,302		
Federal PLUS/Supplemental Loan	$3,949	PLUS/Supplemental Loan Application	Six to eight weeks prior to need for loan proceeds
		EMPLOYMENT	
Federal College Work-Study Program	$ 800	Free Application for Federal Student Aid (FAFSA), Wilkes Financial Aid Application, and Wilkes Application for Student Employment	Prior to beginning work on campus
State Work-Study Program	$ 910	Free Application for Federal Student Aid (FAFSA), Wilkes Financial Aid Application, and SWSP Work-Study Application	Prior to beginning work on campus
Institutional Employment	$ 450	Wilkes Application for Student Employment	Prior to beginning work on campus

*Detailed information on all financial assistance programs is available in the **Consumer's Guide to Financial Aid, Costs, and Charges at Wilkes University.**



Student Affairs and Athletics

Student Activities and Athletics

Student Services

Counseling

Student Affairs

Wilkes University is a community of learning in which extra-curricular activities complement academic life. Students, faculty and staff work together to promote individual development through a variety of activities, programs, organizations and cultural opportunities. All campus organizations are open to all students, and all of them work in close cooperation with faculty advisors and the student affairs staff.

The information which follows gives a brief sketch of some of these activities and organizations. All new students receive a **Student Handbook** which explains governance, outlines University regulations, and provides a directory of student activities.

Residence Life

The Residence Life Program at Wilkes is committed to providing a living environment that is supportive of academic pursuits as well as contributing to personal growth.

The residence hall staff serves to help students enjoy and benefit from their on-campus living experience. Each residence hall is staffed by one or more Resident Assistants who have been selected on the basis of character, leadership and their ability to interact with students. Throughout the year the residence hall staff sponsors various educational and social programs for their residents. The Resident Assistants are also responsible for crisis management, discipline, maintenance requests and insuring that University policies are upheld.

The Residence Life Program offers students a wide variety of living situations. Each residence hall has its own unique style, whether it is a traditional residence hall such as Evans, or one of the older mansions such as Weiss. Each residence hall has lounge areas, as well as full kitchens and laundry facilities. University residence halls are either coed or single sex facilities. Rooms are equipped with single beds, dressers, desks, desk chairs and closet space.

All resident students take part in the University Meal Plan. Meals are served cafeteria style in the dining hall adjacent to Pickering Hall. Resident students also may use their meal cards in the Student Center Snack Bar should they choose to do so. Residents have the option of choosing either a nineteen or a fourteen meal per week plan.

Student Activities

An active Student Government and numerous campus clubs and special-interest organizations provide a structure of activities for student life outside of the classroom. More than 60 clubs and organizations are recognized by Student Government and the University. The University requires that all

campus organizations be open to all students; consequently, groups that are exclusive do not exist. Volunteer Action and Community Service are a cornerstone of Wilkes' mission and tradition. Eligibility for Student Government funding requires that clubs and organizations be actively involved in community service. An Inter-Residence Hall Council, a Commuter Council, and an Off-Campus Students Council organize activities for undergraduate students, and the Student Programming Board oversees a full schedule of social events at the University.

Student publications include the **Beacon**, a weekly newspaper published during the academic year; the **Manuscript**, an annual journal of art, poetry and fiction; and the **Amnicola**, the University yearbook. The University also maintains WCLH, an FM radio station which is operated by students and broadcasts daily at 90.7 MHz. Co-curricular activities depend on the interests and energies of students.

Honor Societies

Several chapters of national and international honor societies have been established on the Wilkes campus. They include:

ALPHA KAPPA DELTA (Sociology)
CHI ALPHA EPSILON (Act 101 Students)
ETA KAPPA NU (Electrical Engineering)
OMICRON DELTA EPSILON (Economics)
PHI ALPHA THETA (History)
PI KAPPA DELTA (Forensics)
PSI CHI (Psychology)
SIGMA PI SIGMA (Physics)
SIGMA TAU DELTA (English)
SIGMA THETA TAU (Nursing)
SIGMA XI (Scientific Research)

Intramural and Intercollegiate Athletics

Wilkes sponsors an active intramural sports program as well as intercollegiate competition in 14 varsity sports. Varsity programs for women include basketball, field hockey, soccer, softball, tennis and volleyball; men compete at the varsity level in baseball, basketball, cross country, football, golf, soccer, tennis and wrestling. With the exception of wrestling, varsity teams compete at the Division III level; wrestling is a Division I program. The University is a member of the Middle Atlantic States Collegiate Athletic Conference (MAC), the Eastern Collegiate Athletic Conference (ECAC), and the National Collegiate Athletic Association (NCAA).

The goal of the intramural program is to provide a comprehensive set of recreational and fitness activities throughout the academic year for the University community. Students, faculty and staff participate in individual, dual and team competitions in the traditional sports as well as in innovative activities like outdoor quad-volleyball, ultimate frisbee tournaments, and a home run derby. Events are organized in full-length seasons, short-term competitions, and one-day special events, using the indoor facilities of the Marts Center as well as the spacious grounds of the Ralston Field Complex.

University Activities

In addition to the curricular and cocurricular activities of particular organizations, a number of all-campus and campus-community events are held each year. Parents' Day, Homecoming, Winter Weekend, and the Cherry Blossom Weekend are typical of the social and cultural events which help to promote an active and involved student body. The University joins area cultural groups each year for the annual Cherry Blossom Festival and for the Fine Arts Fiesta, a four-day festival of music, drama, and the arts presented each spring. A carefully selected Concert and Lecture series is presented throughout the academic year at Dorothy Dickson Darte Center for the Performing Arts and is open to the campus and to the community without charge, as are regular concerts and recitals.



Student Services

Wilkes takes seriously its commitment to encourage students to discover their own abilities and potential and to assist them in making sound, independent decisions. Students are expected to consult regularly with classroom instructors, faculty advisors, the student affairs deans, department chairpersons, or academic deans regarding academic matters. Recognizing that students sometimes need additional guidance in resolving personal, social or academic problems, the University has also institutionalized a variety of programs to assist students, individually and in groups.

New-Student Orientation Program

The transition from the directed work of the high school to the independent and more intensive work of the university is eased by introducing new students to the University and its services before classes formally begin. Two orientation periods during the summer and the days preceding the start of the term are set aside to assist new students in planning their academic programs and learning about the campus, the curriculum, and student activities. At this time, students are also introduced to their academic advisors and briefed on the advising system.

Student Advisement

Specially selected faculty members and administrators have been designated freshman advisors on the basis of their knowledge of curricular matters and, more generally, the University and its services. Each freshman is assigned to a freshman advisor during the orientation period and will meet with this advisor regularly to arrange schedules, discuss academic and career plans, and deal with problems or questions as they arise. These faculty advisors add the special expertise of their disciplines to the advising process. If the student has indicated a major at admission, he or she will be advised by a freshman advisor from the relevant department or program, from the start of his or her studies. Students who are undeclared with regard to their major work with their assigned freshman advisor until they decide on their major; they then shift to a departmental advisor.

International Students

The Coordinator for International Students provides immigration and visa information and assistance as well as advice on personal issues. The Coordinator also provides orientation to life in the United States and the American educational system; assists students in dealings with U.S. and foreign government agencies, other campus offices and departments, and the community; and serves as advisor to the International Student Organization. These services are available to all international students, non-immigrants and immigrants alike.

Special Advising and Counseling Services

Due to the intricacies of certain programs or requirements imposed by professional and graduate schools or external accrediting agencies, the University has named advisors in special areas of interest. The Dean of Health Sciences and specially trained pre-medical advisors function as special advisors to all students interested in professional or graduate school opportunities in medical or health-related fields. The Pre-Law Advisors work with students from any discipline who wish to go on to law school. The International Studies Advisors counsel students in matters relating to studying abroad and career and professional opportunities in this field. The Coordinator of Cooperative Education counsels and advises students interested in this program or a variety of other internship possibilities. Information on any of these special services is available at the Registrar's Office and the Office of Student Affairs.

The Student Affairs Office

The Student Affairs Staff works with students in a holistic manner, providing guidance and support in students' pursuit of their educational goals and in their development as persons preparing to assume the responsibilities of maturely educated persons. Staff members seek to help students resolve personal and academic problems, coordinate emergency situations involving students, and handle referrals from members of the University community. The Dean of Student Affairs, having familiarity with University resources, serves as an ombudsman as well as a sounding board for student concerns. The Offices of Residence Life, Career Services, Student Activities, Health Services, Campus Counseling, Cooperative Education and Volunteer Services report to the Dean of Student Affairs.

Health Service

The University Health Service maintains regular hours while the University is in session for the fall and spring semesters. Registered nurses are available while the Health Service is open, and a physician is available at specified hours during the week. Appropriate referrals are made as necessary to community physicians and hospitals. The University Health Service does not provide clinic hours during the summer months.

In times of escalating health care costs it is essential for students to have health insurance coverage.

Counseling and Testing Service

The Director of Campus Counseling assists students in resolving personal concerns or problems. Appointments are available throughout the day and on evenings and weekends if necessary. Referrals to community agencies and other professionals are made as necessary. The Director of Counseling

also works closely with student groups and the professional staff of the University to provide workshops and group sessions on areas of interest or concern. Testing services are also available, at no charge, to Wilkes students.

Career Services

The Office of Career Services is the liaison between the University and potential employers in business, industry, government, and educational institutions. Various services are offered to assist students at all stages of their career development. No appointment is usually necessary and students are encouraged to participate in this service program by registering at the Max Roth Career Center at 215 South Franklin Street.

Typical services of the Office include career counseling, workshops on resume preparation, interviewing skills, and job search strategies. In addition, the Career Services Office provides a credentials service for all registered candidates, maintains contact with professional and educational organizations through an on-campus recruiting program, and shares job information on various full-time and part-time opportunities of interest to students and alumni.

Flexibility and planning are essential for choosing a major and determining career goals. A Career Resource Library is available to identify a variety of career options for students in any major, and the Career Services Office exists to help the student effectively negotiate these and other career planning tasks.

Each year Wilkes participates in CAREER DAY, a program sponsored jointly by area colleges during the fall semester. At this event, approximately one hundred organizations send employer representatives to meet with students about available career opportunities. In addition, CAREER EXCHANGE, a program sponsored every other year, allows students to meet with Wilkes Alumni and conduct information interviews to facilitate career planning.

Registrants are urged to update their credentials file regularly and to maintain contact with the Office regarding their career activities.

Learning Center

The Learning Center, third floor Conyngham Hall, provides free tutorial services in most courses to Wilkes students. Services include individual tutoring, group study sessions, small group supplemental instruction seminars, and assistance in basic skills. During the summer, the Center offers the five-week STEP Program, which is designed to help entering students improve their English, reading and study skills, and prepare for college-level courses in mathematics, biology and chemistry. STEP is the acronym for Success Through Early Preparation.

Writing Center

The Writing Center is available to all Wilkes students who seek personal assistance with writing problems or writing assignments. Students who experience writing difficulties in courses may be referred to the Center to hone their writing skills.

Act 101 Program

A program for students from Pennsylvania who need academic and financial support, the Act 101 Program allows educationally underprepared students to improve their skills in verbal and written communication, reading comprehension, mathematics and problem solving in an effort to acquaint students with and help them adjust to the many new experiences provided by a college education. The program provides for tutoring and counseling to enhance the students' potential for success in college. Inquiries about this program may be directed to the Admissions Office or the Act 101 Office, third floor, Conyngham Hall.

Upward Bound Program

A federal program at Wilkes since 1967, the Upward Bound Program provides disadvantaged high school students with a college preparatory program of curricular and extracurricular activities designed to improve academic skills and self-confidence and to deepen curiosity and human understanding. Students attend weekly classes and tutoring and counseling sessions on campus. In the summer, the six-week residential program prepares students for fall classes and provides intensive career guidance.

Day Care Service

Since 1982, the University has provided partially subsidized day care service to students through an arrangement with the Child Development Council of Northeastern Pennsylvania. The service offers regular day care services at a reduced fee to students at centers conveniently located near to campus. Children must attend on a regular, scheduled basis to be eligible for the reduced fee.

Bookstore

The Bookstore sells new and used books, stationery and supplies, and memorabilia during normal class hours, and it is open for additional hours at the beginning of each term. The bookstore accepts cash, personal checks (with appropriate identification) and Visa or MasterCard.

Academic Information

Goals of the Educational Program
The Curriculum
The Degrees
Adult, Graduate and Continuing Education
Academic Policies and Procedures
Academic Requirements
Grades
Graduation Requirements

Academic Information

Goals of the Educational Program at Wilkes University

Wilkes University is committed to the liberal education of men and women who value learning for its own sake throughout their lives and participate responsibly as enlightened members of society. The institution's curriculum is designed to stimulate the intellectual, emotional, social, and physical development of each student. Our principal goals are to familiarize students with the content of the various realms of human inquiry, facilitate the integration of their knowledge into a unified whole, provide opportunities for them to acquire a depth of understanding in at least one field of study, and develop their unique capabilities. We believe that every liberally educated person:

— thinks critically, analytically, and creatively;

— communicates effectively;

— cultivates aesthetic sensibilities;

— explores ethical, intellectual, and social values;

— makes ethical judgments based upon a consciously developed moral value system;

— understands and appreciates cultural diversity from historical and contemporary perspectives;

— appreciates the dynamics of an individual functioning within a complex society;

— understands scientific principles and their relationship to technology and culture;

— applies quantitative reasoning in the presentation and interpretation of data;

— pursues life-long recreational activities, acknowledging the importance of physical well-being;

— correlates these goals of liberal learning with career and professional perspectives.

Calendar

The academic year consists of two semesters. The fall semester normally begins in early September and concludes with final examinations in December. The spring semester begins in late-January and closes with a final examination period in May. Commencement exercises are held at the close of the fall and spring semesters and at the conclusion of the summer sessions. A three-week, optional Intersession is offered in January.

The University also provides a broad range of courses in three different summer sessions. The first summer session begins in early June and concludes in mid-July; the second session begins in mid-July and ends in late August. A nine-week evening session complements these two day-school summer sessions; the evening session begins in early June and ends in early August.

An Intersession is held between the fall and spring semesters, during the month of January.

Course Numbering

Courses are designated by three-digit numbers. The first digit denotes the level of the course as follows:

100-199	Introductory courses
200-299	Intermediate courses
300-399	Advanced undergraduate courses
400-499	Courses for graduate students and advanced undergraduates
500-599	Courses for graduate students only (except with special permission)

The second digit indicates subfield within a discipline, as defined by each department. The third digit may designate, when appropriate, either sequencing or time of year, at the discretion of the department.

Degree Programs

Wilkes offers undergraduate programs leading to the Bachelor of Arts, Bachelor of Business Administration, Bachelor of Science, Bachelor of Fine Arts, and Bachelor of Music degrees. Degree programs have been carefully designed so that students may meet the entrance requirements of graduate and professional schools, but they also are structured to ensure that all Wilkes undergraduate degrees represent the broad and solid base of general education that is central to responsible participation in human affairs. Each degree program is designed to achieve particular educational objectives; however, all baccalaureate programs share a set of distinctive goals, which define the Wilkes approach to baccalaureate education. They are outlined on pages 11-13.

The Curriculum

The Wilkes Curriculum has three components. The first is a set of General Education Requirements, which provides a common foundation in the arts and sciences for all bachelor's degrees awarded by the University.

The second component is the major. This component provides for in-depth study of a field of specialization. The requirements for each major offered are found under the departmental listings.

The third component, elective courses, enables students to pursue personal interests, to explore new areas of learning, or to complete a minor or a second major.

General Education: The First Curricular Component

The General Education Requirements are an affirmation of the strong belief of the Wilkes Faculty in the value of study in the arts and sciences for all students. They are intended to serve as a foundation on which all degree programs are based and include a broad spectrum of courses designed to stimulate the student's intellectual, personal, social, and physical development.

The General Education Requirements for all programs follow. Students are urged to use this outline of these Requirements as an explanation of the **Recommended Course Sequence** provided for each major in this Bulletin. With the exception of English 101-102 and Physical Education, which are specifically designated, the designation "Distribution Requirements" in the **Recommended Course Sequence** for each major is a reference back to this statement of the General Education Requirements.

It is the student's responsibility to insure that **all** degree requirements, including the General Education Requirements, are satisfied.

General Education Requirements

The faculty has approved the following set of General Education Requirements which a student must satisfy in order to be eligible for graduation.

I. **Written Expression**

1. English Composition .....0-6 credits
   Students are assigned to an appropriate composition course, based on the results of a writing sample completed at the time of the student's initial registration. Academic credit will be awarded for AP and CLEP passing scores. Students exempted from English 101 based on their writing sample will meet the corresponding requirement but will not be awarded credit. All students should be registered for a composition or ESL course each semester until the requirement is fulfilled, usually no later than the first semester of the junior year.
2. Writing Intensive Courses
   Each student must complete three courses which appear on the "Writing Intensive List," which is available in the Registrar's Office and the Department of English. Writing Intensive courses are offered in nearly all fields. Satisfaction of this requirement will not add credits to most students' programs.

II. **Oral Expression**

1. Completion of COM 101, 144A, 201, 203, 204, 205, 206, 207 or THE 142.

OR

2. Completion of two Oral Presentation Option (OPO) experiences. The Registrar's Office maintains a list of OPO courses. OPO courses enable a specified number of students (or all students) in the course in a semester to complete an approved Oral Presentation experience. Students make arrangements with the instructor of an OPO course to deliver the number of in-

class oral presentations required for completion of the oral presentation requirement of that course. The instructor notifies the Registrar of the names of students in his or her OPO course who have successfully completed the course on an OPO basis.

III. **Computer Literacy**

1. Completion of any credit bearing course in computer science.

OR

2. A grade of 3, 4, or 5 on the Advanced Placement test in computer science or a CLEP test grade in the 50th or higher percentile.

OR

3. Exemption of the requirement through a demonstration of competence in computing by means of assessments administered by the Department of Mathematics and Computer Science.

IV. **Mathematics**

1. A score of 475 or higher on the mathematics section of the Scholastic Aptitude Test (or the equivalent).

OR

2. A passing score on the mathematics placement test administered at the time of the student's initial registration.

OR

3. Completion of a credit bearing course in mathematics, including Math 84.

V. **Physical Fitness**

All students who are physically able are required to participate in a physical education experience for two semesters, including one course designed as a "wellness" course. No academic credit is awarded. The Physical Fitness requirement may also be met by completion of DAN 110, 120, 130 or 150 and one wellness course.

Distribution of Studies Requirements .....30/39 credits

All students must complete at least 30 credits of work in the **distribution areas** listed below. *Only* students majoring in Engineering and Music may choose the lower number of credits in each **distribution area**; *all* other students must complete the higher number of credits in each **area**. All students are eligible, depending on placement in some cases, to select within the credit ranges indicated for the various sub-areas which are components of a **distribution area**.

No more than two ICS 200-level courses may be used to fulfill distribution requirements, and no more than one ICS 200-level course may be used in any single **distribution area**.

Area I: Heritage and Value .....12/15 credits*

Up to six credits in any one sub-area, and up to three credits in other sub-areas, may count toward this requirement.

Sub-Areas	Course Options
History	HST 101 or higher
Literature	ENG 110 or higher
Philosophy	PHL 101 or higher
Foreign Language	LANG 101 or higher
Interdisciplinary Core Studies	ICS 210

Area II: The Scientific World . . . . . **9/12 credits***
Up to eight credits in any one sub-area, and up to four credits in other sub-areas, may count toward this requirement.

Sub-Areas	Course Options
Mathematics **and** Computer Science	MTH higher than 100, CS 115 or higher
Biology	BIO 105 or higher
Chemistry	CHM 101 or higher
GeoEnvironmental Sciences	GES 110 or higher
Physics	PHY 101 or higher
Interdisciplinary Core Studies	ICS 220

Area III: Society and Human Behavior . . . . . **6/9 credits***
Up to six credits in any one sub-area, and up to three credits in other sub-areas, may count toward this requirement.

Sub-Areas	Course Options
Anthropology	ANT 101 or higher
Economics	EC 101 or higher
Political Science	PS 111 or higher
Psychology	PSY 101 or higher
Sociology	SOC 101 or higher
Interdisciplinary Core Studies	ICS 230

Area IV: Artistic Expression . . . . . **3 credits**

Sub-Areas	Course Options
Art	ART 101 or higher
Dance	DAN 100
Music	MUS 101 or higher or 3 credits in performance
Theatre	THE 100 or higher
Interdisciplinary Core Studies	ICS 240

*Only students majoring in Engineering and Music may choose the lower number of credits in a **distribution area.**

Honors in General Education

The Honors Program in General Education is designed for exceptionally talented and strongly motivated students. Successful applicants (for qualifications and application procedures, contact the Admissions Office), who are designated University Scholars, participate in enriched academic and extra-curricular programs which foster creativity, independence, and responsibility.

To earn a General Education honors designation upon graduation, University Scholars need to complete four General Education courses on an honors basis. They can fulfill this requirement by enrolling either in courses designated honors options sections or in special honors seminar sections of the General Education Requirements. University Scholars supplement their enriched academic experience by participating in the meetings and cultural excursions of the University Honors Society.

Selection of a Major: The Second Curricular Component

Each student must complete a major in a discipline or area of concentration in order to graduate. Specific requirements for each major are described in detail in the departmental listing in this Bulletin. The major must be declared prior to the first semester of the student's junior year.

Bachelor of Arts Degree — Majors

Majors in the Bachelor of Arts degree program may be selected from the following subject areas:

Applied and Engineering Sciences
Art
Biochemistry
Biology
Chemistry
Communications
Computer Science
Earth and Environmental Sciences
Economics
Elementary Education
English
French
German
History
Individualized Studies
International Studies
Mathematics
Philosophy
Physics
Political Science
Psychology
Sociology
Spanish
Theatre Arts

Bachelor of Science Degree — Majors

Majors in the Bachelor of Science degree program may be selected from the following subject areas:

Accounting
Biochemistry
Biology
Business Administration
Chemistry
Computer Information Systems
Computer Science
Earth and Environmental Sciences
Electrical Engineering
Engineering Management
Environmental Engineering
Individualized Studies
Materials Engineering
Mathematics
Mechanical Engineering
Medical Technology
Nursing
Physics

Bachelor of Business Administration Degree — Business Major

Bachelor of Fine Arts Degree — Art Major

Bachelor of Music Degree — Majors in Performance and Music Education

Teacher Education

Students who wish to prepare for a teaching career in secondary schools select an appropriate disciplinary major and use their elective credits to meet teacher-certification requirements. Music Education majors must complete all components of the program and secure the approval of the faculty of the Department of Music, Theatre and Dance. Students who wish to prepare for a teaching career in elementary education select an appropriate disciplinary major and major in elementary education. A list of the courses needed for certification is provided in the departmental description of the Education

Department in this Bulletin. Students planning a teaching career must seek counseling in the Education Department early in their first semester.

Elective Credits: The Third Curricular Component

The third component of the Wilkes Curriculum, after the General Education Requirements and the Major Requirements, is composed of elective courses. Students choose elective courses for a variety of reasons: to pursue an interest or to meet requirements for admission to graduate or professional schools or to hone particular skills.

Selection of a Minor

One of the common reasons students select elective courses is to complete a minor in a field other than the student's major field. Although not required for graduation, minors are formally recognized on the student's transcript and may enhance a student's credentials. (Students majoring in a discipline are ineligible for formal recognition of a minor in the same discipline.) Students should consult the departmental listing in this Bulletin to review the specific requirements for formal recognition of a minor field in particular disciplines. They must complete the appropriate form in the Registrar's Office, should they decide to complete a minor. Students must complete a minimum of one-half of their minor field credits in Wilkes University courses for the minor to be formally recognized on the Wilkes transcript.

Cooperative Education

Cooperative Education, another possible use of elective credits, is a program that formally integrates a student's studies with work experiences in employing organizations. Students may alternate semesters of full-time study and full-time professional work experience or they may combine work and study in the same term; in either case, students earn academic credit and, in many cases, a salary while gaining valuable experience in a work environment. Internships are available throughout the United States in the summer, spring and/or fall, and internship placements are readily available to eligible students. Students are urged to explore the various possibilities with the Coordinator of Cooperative Education as soon as possible after their arrival on campus.

Study Abroad

Study Abroad is an elective option to all students in good academic standing who wish to study at overseas institutions. Earned academic credit may be applied toward the requirements for a bachelor's degree at Wilkes. Overseas study may be for a period of a year, a semester, or a summer. A wide variety of curricular offerings, international internships, and living situations are available in over 50 countries throughout the world. Students interested in this option should contact the Study Abroad Advisor in the Department of Foreign Languages.

Double Major

Students may choose to use their elective credits to complete a second major. The student must declare intent to graduate with a double major by completing the appropriate form at the Registrar's Office. It is the student's responsibility to secure the approval of the chairpersons of both departments to ensure that all requirements of the two majors are fulfilled.

Second Baccalaureate Degree

Students who hold a bachelor's degree with a major in one discipline from this or another accredited institution may earn a second baccalaureate degree at Wilkes by completing a major in another discipline, provided the following conditions are met. **All** candidates for the second degree must earn at least thirty credits at Wilkes beyond those required for the first degree and they must meet all of the Wilkes requirements for a degree. Wilkes students may be graduated with two bachelor's degrees simultaneously, but they must complete 30 credits beyond the requirements for the first degree to be eligible for the second degree.

Adult, Graduate and Continuing Education

Part-time Studies

The University welcomes part-time undergraduate students into all of its regular sessions. It has also established the Evening and Weekend Programs to maximize scheduling possibilities for students who cannot attend day classes. Majors in several disciplines are offered in the evening and on weekends, and students may utilize both options, in addition to day-classes, as their commitments and interests change. Many students complete their degree requirements in one or the other of these special formats.

Non-degree students may be admitted to classes which they are qualified to take by reason of their maturity, previous education, and work experience. Secondary school training is desirable, but not necessary, provided the student is qualified to follow such special courses of instruction. Inquiries about all of these programs should be directed to the Office of Evening, Weekend, and Summer Programs.

Evening Program

The Evening Program is designed to meet the needs of those students who cannot attend daytime classes but wish to pursue a degree. Courses generally meet one or two nights per week during the academic year and three nights per week during the nine-week evening summer session. Majors in the following fields are provided in the evening: Accounting, Business Administration, Computer Information Systems, Earth and Environmental Sciences, Electrical Engineering, Engineering Management, Environmental Engineering, History, Materials Engineering, and Physics. Students in-

terested in evening courses should contact the Evening, Weekend, and Summer Office to plan their courses of study.

Weekend Program

Wilkes's Weekend Program provides upper-division courses on the campus of Keystone Junior College in La Plume, Pennsylvania, enabling graduates of Keystone Junior College and other accredited two-year institutions to complete bachelor's degrees in certain majors by taking courses only on weekends. Majors available in the Weekend Program include Accounting, Business Administration, Economics, Psychology, and Sociology. Students beginning as freshmen in the Weekend Program apply for admission to Keystone Junior College.

The courses meet every third weekend on the Keystone College campus, which is ten miles west of Scranton on Route 6/11. Residence hall facilities are available on a first-come, first-served basis to students in both the Keystone and Wilkes programs. Students may carry as many as 9 credits in each of three different sessions arranged over the calendar year. Inquiries about the Weekend College should be directed to the Office of Evening, Weekend, and Summer Programs.

Summer Programs

Wilkes offers a variety of summer courses, workshops, mini-courses, and programs with outdoor activities during the summer months. The summer schedule includes two five-week daytime sessions and a nine-week evening session, plus special sessions. Students interested in the Summer Programs should contact the Evening, Weekend, and Summer Programs Office for specific information.

Graduate Studies

Programs leading to the master's degree are available in the fields of Business Administration (MBA), Education (M.S. Ed, with a variety of concentrations), Electrical Engineering (MSEE), Health Care Administration (MHA), Mathematics, Nursing and Physics (MS).

A separate Graduate Bulletin, which describes graduate programs in detail, is available upon request from the Office of Graduate Studies.

Continuing Education

In addition to courses for credit, Wilkes provides a non-degree Continuing Education program to respond to the needs and interests of the community. This program includes training for business, industry, government, associations, social service agencies, and individuals, through the use of public seminars, in-house presentations and conferences. Inquiries about offerings of the Continuing Education Office should be addressed to the Coordinator of Continuing Education.

Academic Policies and Procedures

Registration

Incoming freshman and transfer students register during the orientation sessions that precede each semester. All students are expected to preregister with their advisors and to register on the dates specified on the University Calendar. Additional information on registration procedures and the exact dates of the orientation sessions can be obtained from the Office of Admissions or the Registrar's Office.

Attendance

Attendance at all classes is expected and required. Repeated absences are a sufficient cause for failure.

Student Load

Students may register for as many as 18 credits in a semester. No student shall be allowed to carry more than 18 credits without the written approval of his or her advisor. An overload will be permitted only for students with a grade point average of 3.00 or higher.

Wilkes/King's Cross-Registration

Wilkes University and King's College offer their students an opportunity to cross-register for courses at either institution. Students register through the Registrar at the institution at which they are enrolled as degree candidates. Interested students should confer with the Registrar for further details.

Auditing Courses

Auditing courses is a practice designed primarily to allow students to expand their educational opportunities. Courses may be taken on an Audit basis only if formal registration is completed prior to the end of the first week of the semester. Permission of the course instructor will be required. Students withdrawing from a course who wish to attend additional classes in that course may do so with the permission of the instructor. However, these students will receive a grade of "W" (withdrawal) in all cases.

Students auditing courses will maintain all standards, including attendance, required by the instructor. Students who do not maintain these standards will not be awarded Audit recognition. All relevant fees will be charged.

Change of Major

Students who wish to change their majors must obtain the approval of the advisor and the department chairperson. The student shall satisfy the curric-

ular requirements of the Bulletin in force at the time of the change. Change-of-major forms are available in the Registrar's Office.

Transfer of Credits

Wilkes students who wish to take courses at another accredited institution (except King's College) must have completed the Transfer of Credit form, available at the Registrar's Office. The student must earn a grade of 2.00 or higher for the work to be credited toward graduation. All students must complete at least 30 credits in residence at Wilkes. Students should consult the section of this Bulletin called **Admission of Transfer Students** with policies and rules governing transfer credits and transfer students.

Grades earned for transfer credits are not included in the calculation of grade point averages.

Withdrawals

A student may withdraw from a course during the first three weeks of the semester by informing the instructor, completing a withdrawal form which is co-signed by the student and the student's advisor, and returning the signed form to the Registrar's Office within the first three weeks of the semester. A student may withdraw from a course from the end of the third week through the eighth week of the semester only with the approval of both the instructor and the student's advisor. Thereafter, a student may withdraw from a course only for medical reasons, supported by a written excuse from a physician, or other extremely serious circumstances, as determined by the dean of the school in which the course is being taught, in consultation with the instructor and the Dean of Student Affairs.

It is the student's responsibility to initiate withdrawal from a course by obtaining the withdrawal form from the Registrar's Office, having it signed by the appropriate personnel, and returning it to the Registrar's Office within the three- or eight-week periods described above. **A grade of "0" is assigned by the instructor and recorded for all courses in which no official withdrawal has been completed by the student.**

For a thorough discussion of this policy, refer to the **Wilkes University Student Handbook.**

The Family Educational Rights and Privacy Act of 1974

In accordance with the provisions of "The Family Educational Rights and Privacy Act of 1974," students, upon request, will be given access to all of their evaluative records which have been established by Wilkes University, with at least one day's advance notice to the office responsible for the records to which the student seeks access.

Academic Requirements

Grades

The primary purpose of any grading system is to inform the student of his or her academic progress. Grade reports are sent to students at the end of each term. Mid-term reports are sent **if the work completed is unsatisfactory.**

Eight numerical grades are given for academic work:

Grade	Interpretation
4.00	Academic achievement of outstanding quality.
3.50	Academic achievement above high quality.
3.00	Academic achievement of high quality.
2.50	Academic achievement above acceptable quality in meeting requirements for graduation.
2.00	Academic achievement of acceptable quality in meeting requirements for graduation.
1.50	Academic achievement above the minimum quality required for credit.
1.00	Academic achievement of minimum quality required for credit.
0.00	Academic achievement below the minimum required for course credit.
P	Passing, no credit.
W	Withdrawal.
N	Audit, no credit.

A grade of "X" means that the student received an incomplete grade. Incompletes will be granted to students who, because of illness or reasons beyond their control, have been unable to satisfy all course requirements including the final examination. When such a grade is given, the incomplete work must be made up by or before the end of the fourth week following the last day of the examination period or the grade becomes zero, unless a special extension has been approved by the Registrar.

Course Credits and Grade Point Average

Each course at the University is assigned a specific number of credits. For example, English 101 is a 3-credit course and Chemistry 115 is a 4-credit course. Usually, credits assigned to the course are determined by the number of hours that the class meets per week.

Below is an example illustrating the method used to compute grade point averages.

Course	Credit Hrs. Attempted		Grade		Quality Points	Credit Hrs. Passed
Bio 106	3	×	4.00	=	12	3
Eng 101	3	×	0.00	=	0	0

Course	Credit Hrs. Attempted		Grade		Quality Points	Credit Hrs. Passed
Fr 101	3	×	2.50	=	7.5	3
Hst 101	3	×	1.50	=	4.5	3
Mus 101	3	×	3.00	=	9	3
Total credit hours attempted	15					
Total credit hours passed						12
Total quality points earned					33	
Average 33 q.p. ÷ 15 hrs. attempted = 2.20						

Notice that the student has accumulated 12 credits toward graduation. The zero grade in English means that the student must repeat that course.

Averages are cumulative; the work of each semester will be added to the total. To graduate a student must have, at the end of the senior year, at least a 2.00 average for all courses and a 2.00 average in the major field.

Transfer credits are not included in the calculation of grade averages.

Academic Honors

The faculty grants recognition for high quality work. To be on the Deans' List, published at the end of each term, a student must earn a semester grade point average of 3.40 or higher for all courses taken. Students taking fewer than twelve credit hours will not be eligible.

Academic Probation and Ineligibility

Freshmen, defined as students who have completed fewer than thirty-six credits, must maintain a 1.70 cumulative grade point average. All other students must maintain a minimum 2.00 in both their major field and cumulative grade point averages. A student who falls below the minimum average required will *automatically* be placed on academic probation, as a warning to the student that he or she is not making satisfactory progress towards a degree, or may be declared academically ineligible.

Students placed on academic probation may be restricted in the number of credits they take the following semester, based on the recommendation of the student's academic advisor and such action by the Academic Standards Committee. The Committee may impose additional restrictions and requirements in individual cases, if it is determined that such restrictions and requirements are in the best interest of the student. Such restrictions may affect the student's participation in extracurricular activities.

Students who remain on academic probation for two consecutive semesters are subject to designation as academically ineligible to continue at the University.

Students who have been declared academically ineligible are not allowed to enroll in any course work at Wilkes for a period of one semester. To be

considered for readmission such students must apply to the Academic Standards Committee and be approved for readmission with a probationary status. Students applying for readmission must present evidence of enhanced prospects for academic success.

A decision of the Academic Standards Committee may be appealed by the student at the designated meeting for appeals at the conclusion of the fall and spring semesters. Appeals must be presented to the Committee either in person or by letter at the appropriate appeals meeting, and should include good and sufficient reasons for appealing.

Academic Honesty

Academic honesty requires students to refrain from cheating and to provide clear citations for assertions of fact as well as for the language, ideas and interpretations of others that have contributed to their written work. Failure to acknowledge indebtedness to the work of others constitutes plagiarism, a serious academic offense that cannot be tolerated in a community of scholars. All instances of academic fraud will be addressed in accordance with the policies of the University.



Graduation Requirements

It is the student's responsibility to meet graduation requirements. All candidates for degrees are expected to be present at Commencement. If circumstances prevent their attendance, students must apply to the Dean of Student Affairs for permission to take the degree or certificate *in absentia.*

The faculty has approved the following requirements which a student must satisfy in order to be eligible for graduation:

1. Complete a *minimum* of 120 credit hours.
2. Satisfy all requirements in the major(s). (Requirements for graduation vary from department to department. See the appropriate section in this Bulletin for the number of credit hours required by each major.)
3. Complete all subjects required for the degree as stated in the Bulletin in force at the time of admission to the program or any subsequent Bulletin.
4. Achieve a minimum cumulative average of 2.00 for all courses.
5. Achieve a minimum cumulative average of 2.00 for all subjects within their major.
6. Achieve a minimum cumulative average of 2.00 for all subjects within their chosen minor(s).
7. Satisfy all requirements of the physical education program.
8. Demonstrate competence in written and spoken English.
9. Satisfy mathematics and computer literacy and other curricular skills and knowledge requirements by participation in assessment procedures.

No student shall be graduated until all financial obligations to the University have been fulfilled.

Degree Honors

The granting of honors at Commencement is based upon the entire academic record achieved by the student at Wilkes University.

Transfer students must have completed a minimum of 60 credits at Wilkes to be eligible to be considered for honors.

Requirements for Degree Honors are:

Summa Cum Laude	3.800
Magna Cum Laude	3.600
Cum Laude	3.400

For Degree Honors, grade point averages are not rounded.

Academic Structure

The School of Business, Society and Public Policy

Departments

- Accounting
- Business Administration and Economics
- Health Care Administration
- Political Science and Public Administration
- Sociology and Anthropology

The School of Liberal Arts and Human Sciences

Departments

- Art
- Communications
- Education
- English
- Foreign Languages and Literatures
- History
- Music, Theatre and Dance
- Nursing
- Philosophy
- Physical Education
- Psychology

The School of Science and Engineering

Departments

- Aerospace Studies
- Biology
- Chemistry
- Electrical and Computer Engineering
- GeoEnvironmental Sciences and Engineering
- Mathematics and Computer Science
- Mechanical and Materials Engineering
- Physics

Schools

Academic Programs

Interdisciplinary Courses

Schools

The School of Business, Society, and Public Policy

Gary A. Giamartino, Ph.D.
Dean of the School

The School of Business, Society, and Public Policy offers a number of programs leading to a Bachelor of Business Administration degree, a Bachelor of Science degree in Accounting, and a Bachelor of Arts degree in Economics, International Studies, Political Science, and Sociology. Minors in all areas also are available.

The unifying concept linking all the various academic programs in the School is the intellectual commitment to the study and analysis of human interaction within the framework or context of a business organization, society, political body, family, or other collective entity. These programs prepare students for professional and leadership positions in business, industry, higher education, social service agencies, government, and nonprofit organizations of many types, as well as professional licensings, graduate education, and professional schools. Interdisciplinary ventures, such as the Computer Information Systems and Engineering Management programs, provide opportunities for students to create individualized educational experiences. The Pre-Law and International Studies programs also are components of the School. At the graduate level, the School offers the Master of Business Administration and Master of Health Administration degrees.

The School includes the following departments:

Accounting
Business and Economics
Health Care Administration
Political Science and Public Administration
Sociology and Anthropology

The School of Liberal Arts and Human Sciences

Robert J. Heaman, Ph.D.
Dean of the School

The School of Liberal Arts and Human Sciences is committed to fostering the fundamental skills, knowledge, and values that are essential to an educated citizenry. The faculty of the School recognizes the ideal of creating enlightened citizens as a vital, evolving challenge. While those entrusted with the responsibility of education must be responsive to the needs and aspirations of all citizens, they must also encourage students to respect the standards that will allow them to achieve excellence and distinction in meeting their goals. Programs in the School of Liberal Arts and Human Sciences offer students an opportunity not only to acquire skills and knowledge, but also to understand and appreciate that their skills and knowledge must be informed by values and measured by standards that make them meaningful. Thus, the School's mission is to encourage students to understand their education in the broadest sense, as an experience that will influence the way they conduct their lives personally and professionally, in relation to their own well-being and the well-being of others.

The School of Liberal Arts and Human Sciences is committed to the values of general education as reflected in the General Education Requirements, which provide a common educational experience for students preparing for a variety of academic, professional, and vocational goals. All students at Wilkes take courses in the disciplines represented in the School, disciplines that teach students to think critically and creatively, to communicate their knowledge effectively, and to understand their place in a complex, diverse, and changing world. Students are encouraged to participate with faculty in extending the boundaries of human knowledge, achievement, and creativity through scholarship, research, artistic expression, and athletic endeavor.

The School of Liberal Arts and Human Sciences includes the following departments:

Art
Communications
Education
English
Foreign Languages and Literatures
History
Music, Theatre and Dance
Nursing
Philosophy
Physical Education
Psychology

The School of Science and Engineering

Umid R. Nejib, Ph.D.
Dean of the School

The School of Science and Engineering (SSE) includes ten academic organizations:

Aerospace Studies	Health Sciences
Biology	Mathematics and Computer Science
Chemistry	Mechanical and Materials Engineering
Electrical and Computer Engineering	Pharmacy
GeoEnvironmental Sciences and Engineering	Physics

and four scientific centers:

The Computer Aided Engineering and Manufacturing Center,
The Environmental Quality Center,
The Materials Processing and Diagnostics Center, and
The Ratchford Field Station.

SSE offers a wide variety of programs based on the philosophy of immersing the student in a coherent educational environment designed to nurture scientific curiosity, professional growth and self-confidence. This environment, which is predicated on the notion that the relationship between the faculty member and the student is like that of the craftsman and the apprentice, is intended to enhance the ability of the student to integrate knowledge, recognize its universality, use it effectively in solving problems, and relate it responsibly to actual professional and community issues. This combined effort moves the student into the University's community of scholars as it provides the scientific knowledge and the analytical skills necessary for ready entry into industry, health-science professions, graduate study, or research. The science-intensive premedical core curriculum helps the students to gain mastery as scientists and problem solvers who are able to conceptualize and conduct independent research.

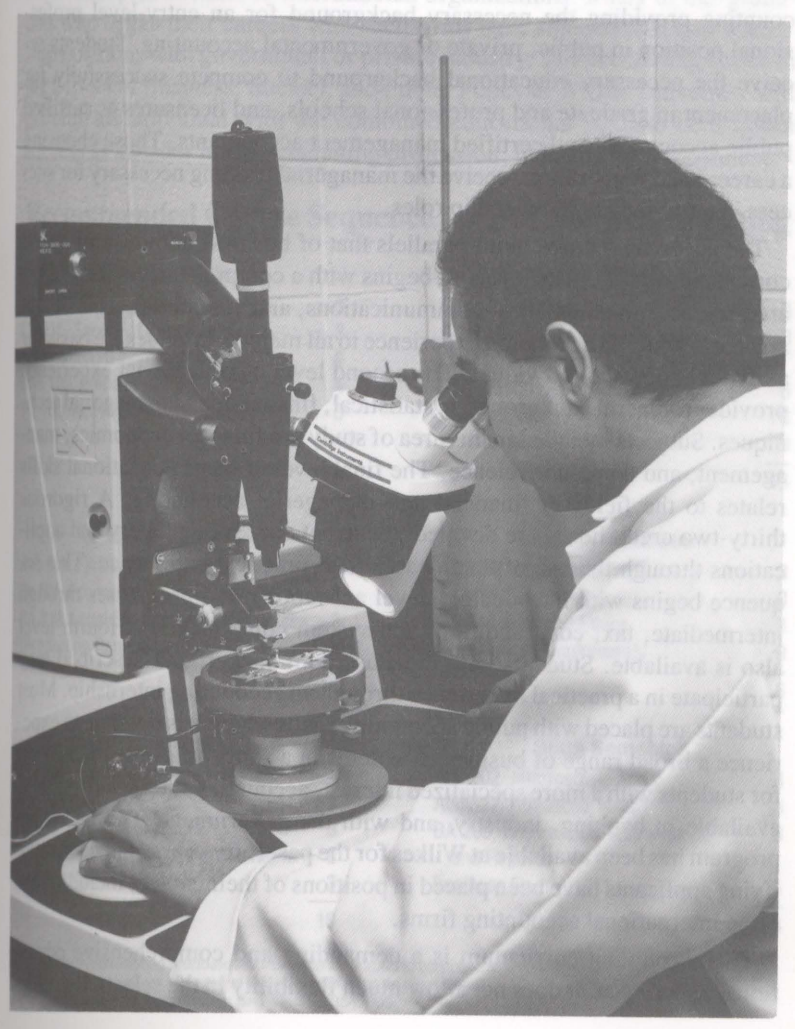
The School promotes an enhanced and synergistic interaction among students and faculty, as well as among colleagues. They are so structured as to provide intense investigative, experimental, and computer experiences through innovative programs and the use of advanced laboratories. The effectiveness of this educational process is characterized by the striking success of our graduates in industry as well as in prestigious professional and graduate schools.

The quality of externally funded projects has underscored, to local firms and world-class industries, the availability of our high-level expertise. The

diverse scientific and technological needs of the community, industry, and government are served through the School's scientific centers and by highly trained scientists and engineers. This activity, channeled through the Technology Transfer Program, has added a new but an important dimension to our students' learning experience.

The School has transfer articulation agreements with a number of medical and professional schools, national and international universities, and community colleges. Internships with industry and hospitals make up yet another experiential component of the professional education.

Many of the programs offered are made available in the evening to the working professional.



Academic Programs

ACCOUNTING

Associate Professor Chisarick, Chairperson; Professor Capin; Associate Professor Broadt; Assistant Professors Latshaw, Rexer.

Total minimum number of credits required for a major in Accounting leading to the B.S. degree — 129.

Total minimum number of credits required for a minor — 26.

The School of Business, Society, and Public Policy offers a major in Accounting providing the necessary background for an entry-level professional position in public, private or governmental accounting. Students receive the necessary educational background to compete successfully for placement in graduate and professional schools, and licensures as certified public accountants and certified management accountants. Those choosing a career in administration receive the managerial training necessary for success in a full range of leadership roles.

The accounting curriculum parallels that of business administration and consists of three tiers or levels. It begins with a comprehensive study of the arts, sciences, mathematics, communications, and humanities. This liberal arts core, which is a common experience to all majors, provides the basis for a broadly educated individual. The second level of educational experience provides a general background in statistical, financial, and managerial techniques. Subjects included in this area of study are finance, economics, management, and computer science. The final level of basic educational skills relates to the fields of financial and managerial accounting. A rigorous thirty-two credit hours are devoted to current accounting theory and applications through the use of texts, cases, and practical experience. This sequence begins with introductory level accounting and progresses through intermediate, tax, cost, auditing, and system components. A fourth level also is available. Students with the classroom background described may participate in a practical experience through an accounting internship. Most students are placed with public accounting firms where it is possible to experience a broad range of business problems in a short time-span. However, for students with a more specialized interest, accounting internships are also available in banking, industry, and with the government. The internship program has been available at Wilkes for the past forty years, and most qualifying applicants have been placed in positions of their choice, including the large international accounting firms.

The accounting curriculum is a demanding and comprehensive educational experience. It does not allow much flexibility in the selection of elective courses outside the basic core. However, both communication and computer skills are now an integral part of each accounting course offering. The individual completing this program is educationally qualified to meet every state's legal requirements for the certified public accountant examination.

Students from other disciplines, even those unrelated to business or economics, have been inclined to select an accounting minor, along with their major field of study. The minor provides the student with enough background to begin with professional entry-level employment while developing a background in his chosen field of study. The minor program is composed of Acc 101-102, Acc 201-202, and twelve additional credits in accounting.

Accounting alumni can be found in firms ranging in size from those of individual practitioners to international organizations. Many of our graduates who began their careers with such firms have since moved into leadership positions with government or private industry. The accounting major in the School of Business, Society, and Public Policy at Wilkes University will provide an individual with the combined educational skills to be a future success as a leader in the accounting profession, industry, or government.

Recommended Course Sequence for a Major in Accounting

First Semester		Second Semester	
Eng 101 Composition I	3	Eng 102 Composition II	3
CS 115 Survey of Computers	3	COM 101 Public Speaking or	3
Distribution Requirements	6	COM 206 Business & Prof. Speaking	
Mth 105 Calculus I	4	Distribution Requirements	6
PE 100 Activity	0	Free Elective*	3
		PE 100 Activity	0
	16		15

Third Semester		Fourth Semester	
Acc 101 Financial Accounting	3	Acc 102 Managerial Accounting	3
Ec 101 Economics I (Core Course)	3	Ec 102 Economics II	3
BA 233 Legal Environment of Business	3	BA 234 Law and Ethics	3
Distribution Requirements	9	Distribution Requirements	9
	18		18

Fifth Semester		Sixth Semester	
Acc 201 Intermediate Acc I	4	Acc 202 Intermediate Acc II	4
Acc 321 Taxes	3	Acc 322 Advanced Taxes**	3
BA 319 Business Statistics	3	BA 209 Business Correspondence	3
BA 351 Management of Organizations	3	and Reports	
Free Elective	3	Business Electives***	6
	16		16

*Students considering graduate studies are encouraged to complete Mth 106.
**Accounting electives. (Two out of three courses must be completed.)
***Two courses from the following: BA 321, 352, 354, 360.

Seventh Semester		Eighth Semester	
Acc 311 Cost Accounting	3	Acc 301 Advanced Accounting	3
Acc 331 Auditing	3	Acc 341 Accounting Systems**	3
Acc 351 Senior Seminar** (Prerequisite for Acc 361)	3	Acc 361 Internship****	6
BA 341 Managerial Finance	3		12
Ec 340 International Trade & Finance or BA 358 International Business Seminar	3		
Free Elective	3		
	18		

*Students considering graduate studies are encouraged to complete Mth 106.
**Accounting electives. (Two out of three courses must be completed.)
***Two courses from the following: BA 321, 352, 354, 360.
****Free electives.

ACC 101. INTRODUCTORY FINANCIAL ACCOUNTING **Three credits**
Introduction and development of the overall accounting function from analysis of business transactions and their systematic recording to the interpretation of the resulting financial statements.
Prerequisite: Sophomore standing or permission of instructor.

ACC 102. INTRODUCTORY MANAGERIAL ACCOUNTING **Three credits**
Introduction to the accounting requirements necessary in a management environment and the uses of accounting data for planning and control of business and non-profit activities.
Prerequisite: Acc 101.

ACC 201. INTERMEDIATE ACCOUNTING I **Four credits**
A comprehensive analysis of the accounting process and the financial statements. Topics included are accounting for cash, receivables, inventories, property plant and equipment, intangible assets, current liabilities, and long-term debt.
Prerequisite: Acc 102.

ACC 202. INTERMEDIATE ACCOUNTING II **Four credits**
A continuation of Intermediate Accounting I. Topics included are accounting for stockholders equity, retained earnings, dilutive securities and earnings per share, investments, revenue recognition, taxes, pensions, leases, accounting changes, financial statement analysis, and cash flow.
Prerequisite: Acc 201.

ACC 301. ADVANCED FINANCIAL ACCOUNTING **Three credits**
A comprehensive analysis and review of the issues relating to various levels of intercompany corporate investments. Topics include acquisitions, mergers, and consolidated financial reporting for both domestic and international corporations. Extensive computerized worksheet applications are an integral part of this course.
Prerequisite: Acc 202.

ACC 311. COST ACCOUNTING **Three credits**
Principles and practices of cost accounting including a study of job, process, and standard cost systems. Informative systems design, budgeting, variance analysis, and direct costing concepts are covered.
Prerequisite: Acc 202.

ACC 321. TAXES **Three credits**
The preparation of federal income tax returns for individuals and businesses based on the current law, regulations, and current decisions; research of tax law, regulations, and current decisions; research of tax law using various tax reference services and computer data-base access.
Prerequisite: Acc 102.

ACC 322. ADVANCED TAXES **Three credits**
Tax accounting for corporations, partnerships, and fiduciaries, including corporate organization, reorganization, distributions and liquidation. Preparation of federal corporate, partnership, and fiduciary returns.
Prerequisite: Acc 321.

ACC 331. AUDITING **Three credits**
An analysis of modern auditing concepts involving staff organization, professional ethics and legal responsibility, internal control, audit programs and working papers, and original record examination.
Prerequisite: Acc 202.

ACC 341. FINANCIAL AND MANAGERIAL ACCOUNTING SYSTEMS **Three credits**
Review of the systems used to accumulate and report accounting information with emphasis on computer applications.
Prerequisite: Acc 202.

ACC 351. SENIOR SEMINAR IN FINANCIAL ACCOUNTING **Three credits**
Current topics in financial accounting and corporate reporting are reviewed. Case studies requiring generally accepted accounting principle applications will be an integral part of the topics covered.
Prerequisite: Acc 202.

ACC 361. ACCOUNTING INTERNSHIP **Six credits**
This course provides on-the-job accounting experience for accounting majors. A minimum of 240 hours is provided with either certified accounting firms, government agencies, or private industry. Internships are offered on a competitive basis following student interviews with interested firms and agencies. Students not obtaining an internship may substitute 6 credits of free electives. (All courses listed through the seventh semester should be taken prior to this course.)
Prerequisite: Acc 351.

ACC 395-396. INDEPENDENT RESEARCH **One to three credits**

ACC 397. SEMINAR **One to three credits**

ACC 198/298/398. TOPICS **Variable credit**
Special offerings designed to introduce students to subjects of current interest in accounting which are not covered in other courses.

AEROSPACE ENGINEERING

Professor Orehotsky, Acting Chairperson; Professor Faut; Associate Professors Ghorieshi, Kalim, Maxwell, Razavi; Assistant Professors Janecek, Mirman; Technical Support Staff: Lennox, Sickler, Wilk.

The two-year program in Aerospace Engineering is offered by the Department of Mechanical and Materials Engineering. This program is specifically designed to provide a successful transfer of students to the junior year at other accredited engineering schools.

Recommended Course Sequence for Aerospace Engineering

First Semester		Second Semester	
Chm 115 Elements and Compounds	4	Chm 118 Chemistry for Engineers	3
Mth 111 Calculus I	4	Mth 112 Calculus II	4
SSE 107 Technological Survival	2	EE 244 FORTRAN	3
ME 180 CADD Lab	1	Phy 201 General Physics I	4
Eng 101 Composition I	3	Eng 102 Composition II	3
PE 100 Activity	0	PE 100 Activity	0
	14		17
Third Semester		**Fourth Semester**	
EE 211 Circuit Theory I	3	ME 232 Strength of Materials	3
EE 283 Electrical Measurements Lab	1	or 324 Heat and Mass Transfer	
ME 231 Statics & Dynamics	3	MaE 200 Materials Engineering	3
Mth 211 Intro. to Differential Equations	4	MaE 284 Engineering Measurements Lab	1
Phy 202 General Physics II	4	Mth 212 Multivariable Calculus	4
Distribution Requirement	3	Phy 203 General Physics III	3
		Distribution Requirement	3
	18		17

AEROSPACE STUDIES (Air Force ROTC)

Lieutenant Colonel Agee, Professor, Chairperson; Assistant Professors Captain Stewart, Captain Werder.

The Air Force Reserve Officer Training Corps (AFROTC) program at Wilkes University permits students to earn commissions as officers in the U.S. Air Force while pursuing a university degree. Students may enroll in either the four-year or two-year program. (Students with three years remaining until graduation may enroll concurrently in the freshman and sophomore Aerospace Studies courses and can complete the four-year program in three years).

General Military Course (4-Year Program Only)

The first two years of the four-year program constitute the General Military Course (GMC). GMC courses are open to any university student and unless a GMC cadet is receiving an AFROTC scholarship, there is no military obligation associated with enrollment in the GMC. The GMC curriculum consists of four one-credit Aerospace Studies courses, plus a non-credit leadership laboratory each semester, which introduces students to U.S. Air Force history and environment, customs, courtesies, drill and ceremonies and leadership skills.

Professional Officer Course (2 and 4-Year Programs)

The final two years of the four-year program comprise the Professional Officer Course (POC). It consists of four three-credit Aerospace Studies courses, plus a non-credit leadership laboratory each semester. POC cadets earn a $100-per-month, tax-free subsistence allowance during the academic year and incur a military obligation. To be accepted into the POC, students must pass a physical examination and an officer qualification test, as well as have an acceptable academic record. Four-year cadets must complete a four-week field training program; two-year applicants must complete a six-week field training program during the summer before POC entry.

Field Training

Field training is conducted at selected Air Force bases. It gives students an opportunity to observe Air Force units and people at work and at home; participate in marksmanship, survival, athletics, and leadership training activities; take aircraft orientation flights; and work with contemporaries from other colleges and universities. Transportation from the legal residence of the cadet to the field training base and return, food, lodging, and medical and dental care are provided by the Air Force. The cadet receives approximately $400 for the four-week field training program or $600 for the six-week field training program.

Advanced Training Program (optional)

This program allows POC members to visit a USAF base for two weeks and work with an active duty officer in the student's chosen career area during the summer between the junior and senior years. Transportation from the legal residence of the cadet to the advanced training base and return, food, lodging, and medical and dental care are provided by the Air Force in addition to a weekly salary.

Uniforms

Uniforms, equipment, and textbooks for AFROTC are supplied by Wilkes University and the U.S. Air Force. All new cadets are required to pay a nominal deposit. If the cadet returns the uniform items in satisfactory condition, the deposit money will be returned.

Scholarships

AFROTC also offers 2-to-5 year, full and partial tuition scholarships for which qualified students may compete, if they enroll in AFROTC. All scholarship awards are based on individual merit, with most scholarship recipients determined by central selection boards. Scholarship selection boards for students already in college are held in January and July each year. Since scholarship applicants must meet certain academic, physical fitness and medical requirements to be considered by the scholarship boards, contact the Aerospace Studies department early, preferably 2-3 months before the boards convene, to apply. High school students wishing to compete for AFROTC college scholarships must complete and submit an application by 1 December of their senior year. ALL AFROTC SCHOLARSHIP RECIPIENTS ENTERING (OR TRANSFERRING TO) WILKES UNIVERSITY RECEIVE **FREE** ROOM AND BOARD.

Commissioning

Students who satisfactorily complete the POC curriculum requirements are commissioned as Second Lieutenants in the U.S. Air Force, and will serve on active duty in a career specialty they have chosen, consistent with USAF needs. Qualified students may compete for duty as pilots, navigators, nurses, engineers, missile or space operations officers, meteorologists, computer analysts, lawyers, security police or any of a number of other career fields.

Recommended 4-Year Course Sequence Leading to a Commission in the United States Air Force

General Military Course (GMC) — Consists of four one-credit courses which are introductory in nature and open to freshmen or sophomores. Nonscholarship students incur no military obligation by enrolling in these courses.

First Semester		Second Semester	
AS 101 Air Force Today I	1	AS 102 Air Force Today II	1
AS 111 Leadership Laboratory	0	AS 112 Leadership Laboratory	0
	1		1

Third Semester		Fourth Semester	
AS 201 The Development of Air Power I	1	AS 202 The Development of Air Power II	1
AS 211 Leadership Laboratory	0	AS 212 Leadership Laboratory	0
	1		1

Variations in the above schedule are possible. Sophomores with no AFROTC experience can enroll in both the one-credit freshman and sophomore classes (the dual-enrollee program). Students with **no** GMC experience may still apply for POC entry, but they must apply as soon as possible in the sophomore year. For further information, call (717) 829-0194 or 1-800-WILKES-U, ext. 4860.

Summer Field Training (Four Weeks)

Professional Officer Course (POC) — Consists of four three-credit courses open to students who have at least two full-time years of college remaining. Students enrolled in the POC receive $100 per month and are under military obligation.

Fifth Semester		Sixth Semester	
AS 301 Air Force Leadership and Management I	3	AS 302 Air Force Leadership and Management II	3
AS 303 Leadership Laboratory	0	AS 304 Leadership Laboratory	0
	3		3

Seventh Semester		Eighth Semester	
AS 311 National Security Forces in Contemporary American Society I	3	AS 312 National Security Forces in Contemporary American Society II	3
AS 313 Leadership Laboratory	0	AS 314 Leadership Laboratory	0
	3		3

AS 111/112/211/212/303/304/313/314, Leadership Laboratory, is mandatory for all cadets who enroll in AFROTC.

General Military Courses

The General Military Courses (GMC) constitute a two-year program for freshmen and sophomores and are designed to provide a general knowledge of the role, organization, missions, and historical development of U.S. air power. Students enrolled in the GMC who are not on Air Force scholarships incur no military obligations. **Note: AS 101-102-201-202 may be substituted for PE 100 series.**

AS 111/112/211/212/303/304/313/314. LEADERSHIP LABORATORY — **No credit**
Involves a progression of experience designed to develop each student's leadership potential in a supervised training laboratory. Examines Air Force customs and courtesies, drill and ceremonies, career opportunities, life and work of an Air Force junior officer.

AS 101. AIR FORCE TODAY I — **Fall — One credit**
Background, missions, and functions of U.S. military forces, with emphasis on U.S. Air Force organization, doctrine, and strategic forces. Development of individual communication skills.

AS 102. AIR FORCE TODAY II — **Spring — One credit**
U.S. general purpose military forces; insurgency and counter-insurgency; aerospace support forces and organizations. Development of individual communication skills.

AS 201. THE DEVELOPMENT OF AIR POWER I — **Fall — One credit**
Air power development in historical perspective through the end of World War II; evolution of missions, concepts, doctrine, and employment, with emphasis on changes in conflict and factors which have prompted technological developments. Development of individual communication skills.

AS 202. THE DEVELOPMENT OF AIR POWER II — **Spring — One credit**
Air power development from the end of World War II to the present; changing missions and employment of air power in support of national objectives. Development of individual communication skills.
Prerequisite: AS 201 or permission of instructor.

Professional Officer Courses

The Professional Officer Courses (POC) constitute a four-semester program, normally taken during the junior and senior years, leading to commissioning as an Air Force officer. The POC concentrates on concepts and practices of management, concepts and practices of leadership, national defense policy, and communicative skills.

AS 301. AIR FORCE LEADERSHIP AND MANAGEMENT I — **Fall — Three credits**
General theory and practice of management with special reference to the Air Force. Covers evolution of management thought including classical, behavioral, and management science schools; study of information systems; quantitative approach to decision-making; policy formulation, principles and practices in planning, organizing, staffing, directing, and controlling business and Air Force activities; resource control techniques; social and ethical issues within the management process; development of communicative skills.
Prerequisite: POC membership. **Note: AFROTC cadets may substitute AS 301 for BA 351.**

AS 302. AIR FORCE LEADERSHIP AND MANAGEMENT II — **Spring — Three credits**
Air Force leadership at the junior officer level, including its theoretical, professional, and legal aspects; practical experience in influencing people, individually and in groups, to accomplish organizational missions effectively; development of communicative skills.
Prerequisite: AS 301 or permission of instructor.

AS 311. NATIONAL SECURITY FORCES IN CONTEMPORARY AMERICAN SOCIETY I — **Fall — Three credits**
The role and functions of the professional military officer in a democratic society and civil-military interaction; basic framework of defense policy and formulation of defense strategy; the impact of East Asia, Latin America, Africa, the Middle East, and the Soviet Union on U.S. national security policy. Development of individual communication skills.
Prerequisite: POC membership or permission of instructor. **Note: AFROTC cadets may substitute AS 311 for PS 398 with Political Science Department approval.**

AS 312. NATIONAL SECURITY FORCES IN CONTEMPORARY AMERICAN SOCIETY II — **Spring — Three credits**
The problems of developing defense strategy in a rapidly changing technological environment; effective deterrent posture and management of conflict; dynamics and agencies of defense policy making.
Prerequisite: AS 311 or permission of instructor.

ANTHROPOLOGY

Associate Professor Garr, Chairperson; Associate Professor Merryman.

The Department of Sociology and Anthropology offers a variety of courses in anthropology. The anthropology curriculum is designed to provide students with a solid grounding in the fundamentals of sociocultural anthropology and an opportunity to study cultural diversity. Students may apply anthropology courses towards B.A. degrees with majors in either International Studies or Sociology (see pages 227 and 307). Anthropology courses may also be used in satisfying General Education requirements in the social sciences.

Students from all majors are invited to complete a "concentration" in Anthropology. A concentration in Anthropology consists of 12 hours, including Ant 101, Ant 102, and two upper-level courses in Anthropology.

Graduates with a strong background in anthropology have used this preparation in a variety of ways. Some have found employment in business and government upon graduation. Others have taken advanced degrees in the social sciences and regional development at American and British Universities. Still others have pursued careers in secondary education.

The following is a listing of the Anthropology courses offered at Wilkes:

ANT 101. INTRODUCTION TO ANTHROPOLOGY — **Three credits**
A general survey of the processes that generate human cultural and biological variation through time and among contemporary human groups. An introduction to cultural and physical anthropology, archaeology, and anthropological linguistics.

ANT 102. CULTURAL ANTHROPOLOGY — **Three credits**
A detailed examination of the methods and theories employed in the description and comparison of human cultures, as applied to problems in intercultural relations. Course content is based upon case and cross-cultural studies.

ANT 211. ANTHROPOLOGY THROUGH FILM — **Three credits**

A general survey of the use of still photography and cinematography in the depiction of the content of various cultures. Fee: $20.

Prerequisite: Ant 101 or Ant 102 or approval of instructor.

ANT 212. INDIANS OF NORTH AMERICA — **Three credits**

The prehistoric development and recent life-ways of native Americans.

Prerequisite: Ant 101 or Ant 102 or approval of instructor.

ANT 213. PEOPLES AND CULTURES OF THE MIDDLE EAST — **Three credits**

An overview of social organization, ethnicity, and cultural development in the Middle East and North Africa. The contributions of ecological, economic, political, and ideological factors to Middle Eastern social systems are examined in regard to present cultural configurations.

Prerequisite: Ant 101 or Ant 102 or approval of instructor.

ANT 214. PEOPLES AND CULTURES OF AFRICA — **Three credits**

An overview of social development in Africa south of the Sahara. Particular attention is paid to Africa's historical relationship to other culture areas, indigenous social patterns, and issues surrounding the push for socioeconomic development in Africa's emergent nations.

Prerequisite: Ant 101 or Ant 102 or approval of instructor.

ANT 231. LANGUAGE AND CULTURE — **Three credits**

The study of relationships among language, culture and perception, and patterns of language use. Recent ethnographic approaches to the understanding of culture and cognition.

Prerequisite: Ant 101 or Ant 102 or approval of instructor.

ANT 321. SOCIOCULTURAL CHANGE — **Three credits**

A systematic evaluation of various attempts by social scientists to document and explain the phenomenon of change. A comprehensive survey of the field is presented through selected readings and discussion of major studies from sociology, cultural anthropology, and archaeology.

Prerequisite: Ant 101 or Ant 102 or approval of instructor.

ANT 395-396. INDEPENDENT RESEARCH — **One to three credits**

Independent study and research for advanced students in the field of the major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.

Prerequisite: By arrangement with an instructor and approval of department chairperson.

ANT 399. COOPERATIVE EDUCATION — **One to six credits**

Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

ANT 491. SEMINAR — **Three credits**

Presentations and discussions of selected themes and issues in anthropology.

Prerequisite: Criteria will vary according to content of seminar.

ANT 198/298/398/498. TOPICS — **Three credits**

A study of topics of special interest not extensively treated in regularly offered courses.

APPLIED AND ENGINEERING SCIENCES

Associate Professor Armand, Chairperson; Professor Emeritus Thomas; Professors Arora, Hostler, Kaska; Associate Professors Ahmad, Bush, Choe, Choudhry, Srinivasan; Assistant Professor Gilmer; Visiting Assistant Professor Sichler; Adjunct Faculty Osadchy; Technical Support Staff: Lennox, Sickler, Wilk.

Total minimum number of credits required for a major in Applied and Engineering Sciences leading to the B.A. degree — 126.

The Electrical and Computer Engineering Department offers both four- and five-year degree programs in Applied and Engineering Sciences. These programs provide strong engineering and scientific experience with advanced techniques heavily integrated into the curriculum. Students intending to major in engineering are encouraged to be well prepared in the sciences and mathematics.

The major in applied and engineering sciences is designed to integrate the traditional liberal arts and sciences with technological courses: general collegiate education is stressed including a broad knowledge of basic technological concepts in a humanistic context. This general education is coupled with a specific academic competence in an area pertinent to the career goals of individual students. Individual concentrations within the major are structured from the 72 credits of unspecified General Education requirements (distribution requirements must be satisfied), science and technology electives, and free electives. A minimum of 15 credits must be completed in a concentration, which may be in a particular discipline or in one of the following interdisciplinary areas: Information Systems, Cognitive Studies, Allied Health, Physical Sciences, Planning & Technology Management, and Environment & Public Policy. Each individual program must be approved by the School's Program Coordinator. The major's structure is flexible enough to permit the completion of a minor or a double major. This major leads to the degree of Bachelor of Arts.

The five-year program in Applied and Engineering Sciences offers the student the opportunity to obtain broader education in the arts and sciences, while completing the requirements for a major in engineering. Upon successful completion of this program, the student is awarded a B.A. degree in Applied and Engineering Sciences. A student may elect to enter this program at any time during his or her period of study. However, because of the sequential nature of the courses in engineering, the timing of this entry is critical.

The student professional chapters of the Society of Women Engineers (S.W.E.), and the Pennsylvania Society of Professional Engineers (P.S.P.E.), in conjunction with the Department, periodically offer seminars on subjects of a timely nature. Attending these seminars is mandatory for the completion of the degree. Students are also highly encouraged to participate

in the activities of other on-campus organizations such as Engineering Club.

In 1979 the Technology Transfer Program (TTP) was initiated to enable the community to draw upon the department's technical expertise and advanced facilities in Northeastern Pennsylvania. This effort is directed to assist in the development and expansion of industries, and the establishment of high technology facilities in Northeastern Pennsylvania.

Honors Programs in Engineering

Upon the recommendation and approval of the engineering faculty, honor students in Engineering will be recognized upon completion of the following requirements: achieving an overall grade point average of 3.25 or better; receiving grades of 3.00 or better in all engineering courses of his or her discipline; pursuing independent research or special projects in engineering; and presenting the results at meetings, conferences, or through publication of a paper. The distinction "Honors in Engineering" will be recorded on the student's transcript upon graduation.

Recommended Course Sequence for a B.A. Degree with a Major in Applied & Engineering Sciences

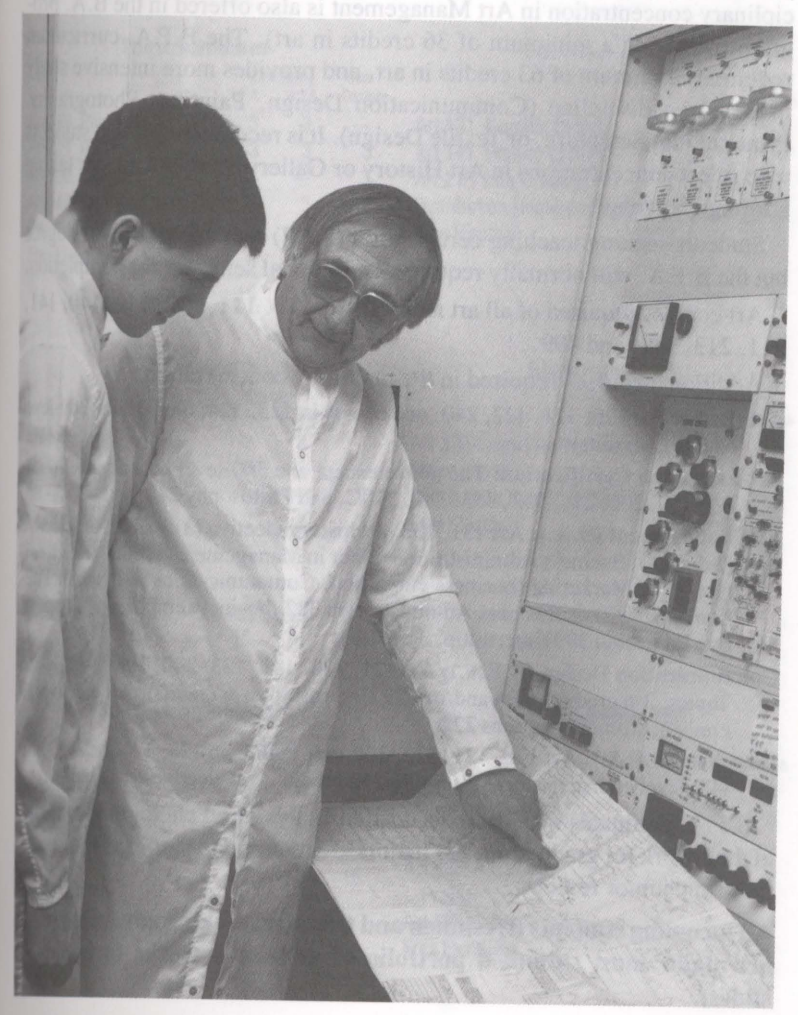
First Semester		Second Semester	
Eng 101 Composition I	3	Eng 102 Composition II	3
Mth 105 Introduction to Calculus I	4	Mth 106 Introduction to Calculus II	4
or 111 Calculus I		or 111 Calculus II	
Distribution Requirement	3	Distribution Requirement	3
SSE 107 Technological Survival	3	Free Electives	6
PE 100 Activity	0	PE 100 Activity	0
	13		16
Third Semester		**Fourth Semester**	
Chm 115 Elements and Compounds	4	Chm 118 Chemistry for Engineers	3
Phy 105 Introductory Physics I	4	Phy 106 Introductory Physics II	4
or 201 Physics I		or 202 Physics II	
ME 180 CADD Lab	1	Computer Science Elective	3
Distribution Requirement	3	Distribution Requirement	3
Free Elective	3	Free Elective	3
	15		16
Fifth Semester		**Sixth Semester**	
Phy 221 Electronics Instrumentation	3	EE 211 Circuit Theory	3
ME 231 Statics & Dynamics	3	MAE 200 Materials Engineering	3
Science & Engineering Electives	3-4	Science & Engineering Electives	6
Distribution Requirement	3	Distribution Requirement	3
Free Elective	3	Free Elective	3
	15-16		18

Seventh Semester		Eighth Semester	
EE 391 Senior Project I*	1	EE 392 Senior Project II*	2
Soc 391 Social Soundness Analysis I	1	Soc 392 Social Soundness Analysis II	2
Science & Engineering Electives	9	Science & Engineering Electives	6
Distribution Requirement	3	Distribution Requirement	3
Free Elective	3	Free Elective	3
	17		16

*EE 391 and 392 can be replaced by EgM/ENV/MAE/ME 391 and 392 depending on the student's concentration.

The Science & Engineering Electives, the Free Electives, and the General Education Requirements must be selected from a program outline approved and documented in advance by the program coordinator and the student's advisor. One course in the area of project management is required in the senior year. A minimum of six credits is required in 300-level courses in Science and Engineering Electives.

General Education Requirements constitute a total of fifteen credits in Heritage & Value, three in Artistic Expression, and six in Society & Human Behavior, selected to satisfy the distribution requirements.



ART

Professor Fuller, Chairperson; Professor Emeritus Simon; Professor Sterling; Assistant Professor Bowar; Adjunct Faculty Adams, Cohen, Stanford.

Total minimum number of credits required for a major in Art leading to the B.A. degree — 123.

Total minimum number of credits required for a major in Art leading to the B.F.A. degree — 123.
(Art Education Certification may require additional credits.)

Total minimum number of credits required for a minor in Art — 18. (Above Art 101)

The B.A. curriculum requires a minimum of 42 credits in art. An interdisciplinary concentration in Art Management is also offered in the B.A. program (requiring a minimum of 36 credits in art). The B.F.A. curriculum requires a minimum of 63 credits in art, and provides more intensive study in a chosen discipline (Communication Design, Painting, Photography, Printmaking, Sculpture, or Textile Design). It is recommended that students who select concentrations in Art History or Gallery Studies consider taking a foreign language.

Students seeking teaching certification (K-12) may pursue either degree but the B.F.A. will normally require an additional semester for completion.

Art courses required of all art majors: Art 110, 111, 112, 113, 140, 141, 211, 213, 341, and 499.

Additional courses required in the major, by concentration:

Art (B.A.): Art 120, 121, 122, 240, one course in 123, 124, or 133, one 300-level course (3 credits);

Art Education Certification: The above except one 300-level course plus Education 190, 200, 210, 352, 353, 380, 390C, and Philosophy 240.

Art Management (B.A.): Art 131, 133, art history elective (3 credits), art elective (3 credits), Business Administration minor in Management (administration emphasis) or Marketing (business emphasis), Communications 101 (administration emphasis) or Business Administration 322 (business emphasis), Cooperative Education 399 (internship, 3 credits);

Communication Design (B.F.A.): Art 121, 130, 131, 133, 240, 298/398 (Design Topics, 3-6 credits), 490 and/or 399 (Internship, 3-6 credits), Art electives (9 credits), Communications 222;

Fine Arts (B.F.A.): Art 120, 121, 122, 240, one course in 123, 124, or 133, 300/400-level course in single discipline (12 credits); art electives (12 credits).

B.F.A. graduates will present a written analysis and photographic survey of their work for graduation. Art majors are required to participate in sophomore and junior reviews.

All incoming students (freshmen and transfer) seeking admission to the art major must submit a portfolio of at least 8 works (originals or slides).

Recommended Course Sequences for a Major in Art Leading to the B.F.A. Degree

First Semester

	Fine Arts B.A.	Fine Arts B.F.A	Com. Design
Art 110 Studio Skills	1	1	1
Art 111 Color & Design I	3	3	3
Art 113 Drawing & Composition	3	3	3
Eng 101 Composition I	3	3	3
Distribution Requirements	6	6	6
PE 100 Activity	0	0	0
	16	16	16

Second Semester

	Fine Arts B.A.	Fine Arts B.F.A	Com. Design
Art 112 3-D Design	3	3	3
Art 211 Color & Design II	3	3	3
Eng 102 Composition II	3	3	3
Distribution Requirements	6	6	6
PE 100 Activity	0	0	0
	15	15	15

Third Semester

	Fine Arts B.A.	Fine Arts B.F.A	Com. Design
Art 120 Painting I	3	3	—
Art 121 Printmaking I	3	3	3
Art 130 Graphic Prod.	—	—	3
Art 140 History of Art I	3	3	3
Distribution Requirements	3	3	6
Free Elective	3	3	—
	15	15	15

Fourth Semester

	Fine Arts B.A.	Fine Arts B.F.A	Com. Design
Art 131 Graphic Design I	—	—	3
Art 141 History of Art II	3	3	3
Art 213 Life Drawing	3	3	3
Distribution Requirements	6	6	6
Free Elective	3	3	0
	15	15	15

Fifth Semester

	Fine Arts B.A.	Fine Arts B.F.A	Com. Design
Art 122 Sculpture I	3	3	—
Art 123, 133, or 248	3	3	—
Art 133 Photography I	—	—	3
Art 240 Modern Art	3	3	3
COM 222 Broadcast Prod.	—	—	3
Distribution Requirement	3	3	3
Free Elective	3	3	3
	15	15	15

Sixth Semester

	Fine Arts B.A.	Fine Arts B.F.A	Com. Design
Art 300-Level Elective	3	3	3
Major Elective	—	3	3
Distribution Requirement	3	3	3
Free Electives	9	6	6
	15	15	15

Seventh Semester

	Fine Arts B.A.	Fine Arts B.F.A	Com. Design
Major Electives	—	9	6
Free Electives	15	6	6
Art 399 Internship	—	—	3
	15	15	15

Eighth Semester

	Fine Arts B.A.	Fine Arts B.F.A	Com. Design
Design Topic	—	—	3
Art 341 Sem: Contemp. Issues	2	2	2
Art 490 Advanced Problems	—	9	6
Art 499 Senior Exhibition	0	0	0
Free Electives	15	6	6
	17	17	17

Recommended Course Sequences for an Art Major and Certification in Art Education

First Semester

	B.A.	B.F.A.
Art 110 Studio Skills	1	1
Art 111 Color & Design I	3	3
Art 113 Drawing & Composition	3	3
Eng 101 Composition I	3	3
Psy 101 General Psychology	3	3
Distribution Requirement	3	3
PE 100 Activity	0	0
	16	16

Second Semester

	B.A.	B.F.A.
Art 112 3-D Design	3	3
Art 211 Color & Design II	3	3
Eng 102 Composition II	3	3
Psychology Elective	3	3
Distribution Requirement	3	3
PE 100 Activity	0	0
	15	15

Third Semester

	B.A.	B.F.A.
Art 120 Painting I	3	3
Art 121 Printmaking I	3	3
Art 140 History of Art I	3	3
Ed 190 Effective Teaching	3	3
Phl 101 Intro. to Phil.	3	3
	15	15

Fourth Semester

	B.A.	B.F.A.
Art 141 History of Art II	3	3
Art 213 Life Drawing	3	3
Ed 200 Educ. Psych.	3	3
Ed 210 Multicultural Educ.	2	2
Distribution Requirements	6	6
	17	17

Fifth Semester

	B.A.	B.F.A.
Art 122 Sculpture I	3	3
Art 123 or 133 or 248	3	3
Art 240 Modern Art	3	3
Phl 240 Phil. of Art	3	3
Distribution Requirements	3	6
	15	18

Sixth Semester

	B.A.	B.F.A.
Art 123 or 248 or 270	3	3
Art 341 Sem: Contemp. Issues	2	2
Art 300-Level Elective	—	3
Ed 352 Art Methods	4	4
Ed 380 Content Area Reading	2	2
Distribution Requirements	6	3
	17	17

Seventh Semester

	B.A.	B.F.A.
Ed 353 Art Curricula	3	3
Art 300-Level Elective	3	—
Major Electives	—	6
Free Electives	9	9
	15	18

Eighth Semester

	B.A.	B.F.A.
Ed 390C Intern Teaching	15	15
Art 499 Senior Exhibition	0	0
	15	15

Ninth Semester

	B.A.	B.F.A.
Art 490 Advanced Problems	—	9
Major Electives	—	6
		15

Recommended Course Sequence for a Major in Art Management

First Semester

Art 110 Studio Skills	1
Art 111 Color & Design I	3
Art 113 Drawing & Composition	3
Eng 101 Composition I	3
Distribution Requirements	6
PE 100 Activity	0
	16

Second Semester

Art 112 3-D Design	3
Art 211 Color & Design II	3
Eng 102 Composition II	3
Distribution Requirements	6
PE 100 Activity	0
	15

Third Semester

Art 140 History of Art I	3
BA 322 Advertising or Acc 121 Elementary Accounting I	3
Ec 101 Principles of Economics I	3
Distribution Requirement	3
Free Elective	3
	15

Fourth Semester

Art 131 Graphic Design	3
Art 141 History of Art II	3
Art 213 Life Drawing	3
BA 321 Marketing or Acc 122 Elementary Accounting II	3
Ec 102 Principles of Economics II	3
	15

Fifth Semester

Art 133 Photography I	3
Art History 200-level	3
BA Elective or BA 351 Principles of Mgmt.	3
Distribution Requirement	3
Free Elective	3
	15

Sixth Semester

Art Elective	3
BA Elective or BA 354 Organizational Design	3
Distribution Requirement	3
Free Electives	6
	15

Seventh Semester

COOP 399 Internship	3
BA Elective	3
Distribution Requirements	9
	15

Eighth Semester

Art 397	2
BA Elective	3
Free Elective or COM 101 Speech	3
Free Electives	9
Art 499 Senior Exhibition	0
	17

ART 101. EXPERIENCING ART I — **Three credits**
Lectures and discussion on the elements of art and the forerunners of modern and contemporary art. Two and three dimensional studio work is explored through the creative process in a variety of media.

ART 110. STUDIO SKILLS — **One credit**
This course provides art students with an introduction to basic materials, tools, and techniques with which artists should be familiar, over and above those covered in specific disciplines. Students will keep a notebook suitable for future reference. Required for all art majors, preferably in their freshman year. Offered each fall semester.

ART 111. FUNDAMENTALS OF COLOR AND DESIGN I — **Three credits**
A fundamentals course for all art majors involving the basic elements of design and the study of color systems including their physical, psychological, and sociological properties.

ART 112. THREE DIMENSIONAL DESIGN — **Three credits**
An introductory course in understanding and manipulating form in three dimensions. Students will do a series of space and form projects emphasizing design and employing such materials as paper, wire, sand, plaster, clay, and wood.

ART 113. DRAWING AND COMPOSITION — **Three credits**
An introductory course exploring the organization and potential of line, space, and texture through a variety of media and subject matter.

ART 120. PAINTING I — **Three credits**
An introduction to painting methods, techniques, and materials. Emphasis on the organization of composition and painting techniques.

ART 121. PRINTMAKING I — **Three credits**
An introduction of relief, intaglio, and planographic techniques including block printing, etching, lithography, and silk screen.

ART 122. SCULPTURE I — **Three credits**
An introductory course into the basic concepts of three dimensional form and space. Modeling in clay from life; casting and direct building techniques in plaster; basic carving experiences in stone and wood. Fee: $20.

ART 123. CERAMICS I — **Three credits**
Exploration into the basic methods and techniques of hand building and wheel work. Experimentation in surfaces decoration, glazing, and kiln firing. Fee: $30.

ART 124. SURFACE DESIGN I — **Three credits**
An exploration of both traditional and contemporary methods of the fabric enhancement, with emphasis on the Shibori process. Fee: $20.

ART 125. WATER COLOR PAINTING — **Three credits**
An exploration into painting methods of transparent and opaque paints involving still life, landscape, and a wide range of other subject matter.

ART 130. GRAPHIC ARTS PRODUCTION — **Three credits**
An overview of the graphic arts industry emphasizing production procedures from the mechanical stage to the printed piece. Attention will be given to typography, typesetting, printing processes, paste-up, printing papers, binding and finishing. Visits to printers and publishers will be included. Fee: $25.

ART 131. GRAPHIC DESIGN I — **Three credits**
Familiarization with the tools, design elements, and production processes of the graphic artist. The value and contribution of the graphic arts to society will be discussed. Students will experience methods and techniques currently being practiced in the graphic design field. Fee: $25.

ART 133. PHOTOGRAPHY I — **Three credits**
An introduction to the fundamentals of photography; camera usage, subject consideration, lighting, darkroom techniques, and the preparation of photographs for exhibit. Fee: $25.
NOTE: Each student must have access to an adjustable 35mm camera.

ART 140. HISTORY OF ART I — **Three credits**
A survey of the art and architecture of Western Civilization from pre-history through the Early Renaissance. Non-western cultures will also be introduced. Slide lectures and discussion will focus on major artworks and trends within their cultural setting.

ART 141. HISTORY OF ART II — **Three credits**
A survey of the art and architecture of Western Civilization from the High Renaissance to the present. Slide lectures and discussions will focus on major artists, artworks, and trends within their cultural setting.

ART 211. FUNDAMENTALS OF COLOR AND DESIGN II — **Three credits**
An advanced approach to color and design as applied to two dimensional art, for both the fine arts student and the student wishing to apply color and design to commercial art.
Prerequisite: Art 103 or permission of instructor.

ART 213. LIFE DRAWING — **Three credits**
The development of drawing skills using the live model. Fee: $25.
Prerequisite: Art 105 or permission of instructor.

ART 220. PAINTING II — **Three credits**
Increased emphasis on development of style and experimentation in contemporary art methods and techniques.
Prerequisite: Art 221 or permission of instructor.

ART 221. PRINTMAKING II — **Three credits**
Further development of multi-color printing techniques using intaglio, relief and lithographic methods.
Prerequisite: Art 225 or permission of instructor.

ART 222. SCULPTURE II — **Three credits**
An exploration into metal sculpture employing gas and electric welding processes; plastics. Advanced work in carving, construction, and assemblage in various media. Fee: $20.
Prerequisite: Art 233 or permission of instructor.

ART 223. CERAMICS II — **Three credits**
Advanced work in both hand-built and wheel-thrown ceramics. Fee: $30.
Prerequisite: Art 243 or permission of instructor.

ART 233. PHOTOGRAPHY II — **Three credits**
Advanced work in black and white photography, including the zone system; refined darkroom techniques and development of a personal style. Fee: $25.
Prerequisite: Art 270 or permission of instructor.

ART 240. MODERN ART AND DESIGN — Three credits

20th century art and design will be considered in relation to central themes in modern civilization, such as science and technology, social and political revolution, historicism, and formalism. Slide lectures and discussions will treat objects as diverse as paintings and refrigerators, buildings and billboards.

ART 248. FIBER I — Three credits

An introduction to the techniques and aesthetic uses of fiber in its single element and basic weaving processes.

ART 341. SEMINAR: CONTEMPORARY ISSUES — Two credits

Ideas and problems in contemporary art and criticism will be discussed, using current literature and exhibitions.

Prerequisite: Junior or senior standing.

ART 348. FIBER II — Three credits

Advanced study of weaving processes using a variety of loom structures.

Prerequisite: Art 248 or permission of instructor.

ART 395-396. INDEPENDENT RESEARCH — One to three credits

Independent study and research for advanced students in the field of the major under the direction of a staff member. A research project at a level significantly beyond a term paper is required.

Prerequisite: Approval of department chairperson is required.

ART 399. COOPERATIVE EDUCATION — One to six credits

Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

ART 198/298/398. TOPICS — Variable credit

A study of topics of special interest not extensively treated in regularly offered courses. Recent studio topics have included Ceramic Sculpture, Color Photography, and Typography. Recent art history topics have included Nineteenth Century Art and Modern Architecture.

ART 490. ADVANCED PROBLEMS IN STUDIO — One to six credits

Independent work in a selected studio discipline for the advanced student. Periodic consultation with the instructor will be arranged. May be repeated for a maximum of 15 credits in any one discipline. Open only to junior and senior B.F.A. candidates. Fee: variable.

Prerequisite: Appropriate 300-level course.

ART 499. SENIOR EXHIBITION — No credit

Every senior will prepare an exhibition of his or her work, in consultation with the student's faculty advisor. The exhibition may be presented either in the fall or spring term.

BIOCHEMISTRY

Professor Faut, Chairperson; Professors Emeriti Bohning, Salley, Swain; Professors Rozelle, Stine; Associate Professor Phillips; Assistant Professor Wignot; Laboratory Manager Graves; Adjunct Professor Gregorek.

Total minimum number of credits required for a major in Biochemistry leading to the B.S. degree — 128.

Total minimum number of credits required for a major in Biochemistry leading to the B.A. degree — 125.

The Biochemistry curriculum is designed to provide comprehensive background education and training for those students interested in this specialty area. The B.S. degree curriculum was developed for those students who wish to prepare for Biochemistry as a professional option. Holders of the degree can seek employment directly in the field or they can pursue advanced degrees in graduate school. Positions are available in a number of biological and chemical companies, government laboratories, and college and university laboratories.

The B.A. degree was developed for those students who are interested in Biochemistry as a means of preparation for entrance into health science professional schools. Examples of such schools are allopathic, osteopathic, and podiatric medicine, dental medicine, pharmacy, optometry, etc. A specific feature of the B.A. degree program is that students may pursue the first three years of the biochemistry degree curriculum in the three year option under the Philadelphia College of Osteopathic Medicine — Wilkes University combined seven year medical and baccalaureate degree program.

Recommended Course Sequence for a Bachelor of Arts Degree and Bachelor of Science Degree in Biochemistry

First Semester	B.A.	B.S.	Second Semester	B.A.	B.S.
Chm 115 Elements and Compounds	4	4	Chm 116 The Chemical Reaction	4	4
Bio 121 Principles of Modern Biology I	4	4	Bio 122 Principles of Modern Biology II	4	4
Mth 111 Calculus I	4	4	Mth 112 Calculus II	4	4
Eng 101 Composition I	3	3	Eng 102 Composition II	3	3
PE 100 Activity	0	0	PE 100 Activity	0	0
	15	15		15	15

Third Semester	B.A.	B.S.	Fourth Semester	B.A.	B.S.
Chm 231 Organic Chemistry I	4	4	Chm 232 Organic Chemistry II	4	4
Phy 201 General Physics	4	4	Phy 202 General Physics II	4	4
Mth 211 Intro. Linear Algebra and Differential Equations	0	4	Bio 226 Cellular and Molecular Biology	4	4
Distribution Requirements	6	3	Distribution Requirement	3	3
CS Elective	3	3			
	17	18		15	15

Fifth Semester

		B.A.	B.S.
Chm 251	Physical Chemistry I	3	3
Chm 253	Physical Chemistry I Lab	0	1
Chm 361	Biochemistry I	3	3
Chm 363	Biochemistry Lab	1	1
Major Elective		4	4
Distribution Requirements		6	6
		17	18

Sixth Semester

		B.A.	B.S.
Chm 242	Instrumental Analysis Lab	2	2
Chm 252	Physical Chemistry II	0	3
Chm 254	Physical Chemistry II Lab	0	1
Chm 342	Instrumental Analysis	2	2
Chm 362	Biochemistry II	3	3
Distribution Requirements		9	6
		16	17

Seventh Semester

	B.A.	B.S.
Major Electives	6	6
Bio/Chm 391 Senior Research I	1	1
Distribution Requirements	3	9
Free Electives	6	—
	16	16

Eighth Semester

	B.A.	B.S.
Bio/Chm 392 Senior Research II	2	2
Free Electives	12	12
	14	14

Major Electives:

Chemistry Electives: One required (Mth 212, Chm 222, 252, 273, 323, 346 or others with approval of the department)

Biology Electives: Two required (Bio 324, 326, 327 or 345)

Special Requirements

Chemistry 391-392 are laboratory research courses. The senior project can be done in either the chemistry or biology departments. If the project is done in the biology department the written project proposal must be approved by the student's advisor and the departments. A student may obtain permission of the department to carry out a Senior Project which is not laboratory research. This permission will be granted only in exceptional cases.

Teacher certification students must satisfy the requirements described on pages 158-161, as they pertain to chemistry certification. The certification student must take an introductory biology course, must work in the Chemistry Department as a Laboratory Assistant for a minimum of one semester, and will be required to do certain special assignments related to teacher training in Chm 391.

All Biochemistry majors must complete three credit-hours of Computer Science courses.

The Chemistry Department strongly recommends that students elect a foreign language to satisfy one of the General Education humanities requirements. The language of choice should be German, Russian, or French in that priority.

The Chemistry Department strongly recommends that students elect COM 101, Public Speaking.

All upper division Chemistry majors are expected to attend Department seminars. Seniors must participate in the seminars to receive credit for Chm 391.

BIOLOGY

Professor Turoczi, Chairperson; Professors Emeriti Ogren, Reif; Associate Professors Hayes, Klemow, Pidcock; Assistant Professors Kalter, Steele; Adjunct Faculty Zehner; Laboratory Preparations Specialist, Zayleskie.

Total minimum number of credits required for a major in Biology leading to the B.A. degree — 124.

Total minimum number of credits required for a major in Biology leading to the B.S. degree — 124.

Total minimum number of credits required for a minor — 22.

The biology program is a generalized program covering basic areas of biology. Specific pre-professional training is minimized in favor of the broadest possible background in the liberal arts as well as the biological sciences.

The B.A. curriculum offers flexibility so that those students in secondary education who are preparing to teach can include the professional semester of student-teaching either in the seventh or eighth semester. In addition, this program provides the opportunity for students to double major and jointly satisfy the requirements of both the Department of Biology as well as those of the other department involved. Students majoring in Biology may receive a Pennsylvania Teaching Certificate for teaching elementary school or Biology in grades 7-12. Please see the requirements listed in the Education section of this Bulletin.

The B.S. curriculum meets all of the liberal arts requirements for the Bachelor of Arts degree. In addition, it provides a greater concentration of advanced biology courses. This program is recommended for those students planning to enter industry, professional schools, or continue with graduate study in biology.

In order to emphasize the broadening aspects of biological knowledge, the department has established categories of specific biological fields from which the student must achieve reasonable diversity in the selection of upper-level courses. The four categories are (1) animal diversity, (2) molecular/cellular biology, (3) populational biology, and (4) botanical biology. The B.A. major is required to take one upper-level course from each of the four categories; the B.S. major must take one upper-level course from each of the four categories and additionally select any one course from those same categories to fulfill 18 credits.

Courses within the four categories are constituted as follows:

(1) Animal Diversity — Bio 300-319
(2) Molecular/Cellular — Bio 320-339
(3) Populational — Bio 340-359
(4) Botanical — Bio 360-369

Students in majors other than Biology may wish to elect a minor in Biology. The minor in Biology shall consist of a minimum of 22 credits. Required courses are Bio 121-122, 225-226 plus two 300-level, biology electives. These upper-level electives (exclusive of Independent Research, Bio 395-396) will be selected after consultation with the department chairperson.

Summer Experiences and Opportunities in the Marine Sciences and Oceanography Wallops Island Marine Science Station

Wilkes University is a member of the Wallops Island Marine Science Consortium, an association of both state and private institutions that oversee the operation of a marine field station located in southeastern Virginia. Through its membership in the Consortium, Wilkes offers to its students the full range of courses in marine sciences and oceanography regularly taught at the Station each summer. Interested students in Biology and GeoEnvironmental Sciences (as well as any other students meeting course prerequisites) are encouraged to complement regular course work with these unique summer field experiences.

Courses taken at the Wallops Island Marine Science Station can be used to fulfill some of the upper level requirements in the Biology and GES Majors. Courses typically carry three credits and involve three weeks of intensive field and laboratory study at the Marine Station and related field sites (e.g. Florida Keys). Facilities at the station include dormitory space, cafeteria, labs, lecture halls, a variety of field and laboratory equipment (e.g. two large oceanographic vessels) and a range of coastal, marine, and estuarine field sites. To enroll, students must first contact the coordinators of the Wallops Island Program at Wilkes University (prior to the spring semester) and then register for the appropriate course through the Wilkes University Registrar.

Courses regularly offered at the Station include:

MS 110 Introduction to Oceanography
MS 211 Field Methods in Oceanography
MS 221 Marine Invertebrates
MS 241 Marine Biology
MS 250 Wetland Ecology
MS 260 Marine Ecology
MS 330 Tropical Invertebrates
MS 331 Chemical Oceanography
MS 343 Marine Ichthyology
MS 345 Ornithology
MS 362 Marine Geology
MS 431 Ecology of Marine Plankton
MS 491 Coral Reef Ecology
MS 492 Marine Mammals
MS 500 Problems in Marine Science

See Coordinators of the Wallops Island Program for outlines of individual courses and more information on how to integrate these courses into Biology and GeoEnvironmental Sciences curricula.

Honors Program in Biology

Honor students in Biology will be recognized upon completion of the following requirements: achieving a graduating grade point average of 3.25 or better, receiving grades of 3.00 or better in all biology courses, pursuing independent research in biology and presenting their project results either at a national or regional scientific conference or through publication of a research paper. The distinction "Honors in Biology" will be recorded on the student's transcript upon graduation.

Recommended Course Sequences for a Major in Biology

First Semester

	B.A.	B.S.
Bio 121 Principles of Modern Biology I	4	4
Chm 115 Elements & Compounds	4	4
Eng 101 Composition I	3	3
Mth 105 Calculus for Life, Managerial, and Social Sciences I or Mth 111 Calculus I	4	4
	15	15

Second Semester

	B.A.	B.S.
Bio 122 Principles of Modern Biology II	4	4
Chm 116 The Chemical Reaction	4	4
Eng 102 Composition II	3	3
Mth 106 Calculus for Life, Managerial, and Social Sciences II or Mth 112 Calculus II	4	4
	15	15

Third Semester

	B.A.	B.S.
Bio 225 Population and Evolutionary Biology	4	4
Chm 231 Organic Chemistry I	4	4
Distribution Requirements	6	6
PE 100 Activity	0	0
	14	14

Fourth Semester

	B.A.	B.S.
Bio 226 Cellular and Molecular Biology	4	4
Chm 232 Organic Chemistry II	4	4
Distribution Requirements	6	6
PE 100 Activity	0	0
	14	14

Fifth Semester

	B.A.	B.S.
Bio 397 Seminar*	1	1
Bio Elective/Research	3	3
Phy 171 Introductory Physics I	4	4
Distribution Requirements	6	3
Free Elective**	3	3
Mth 150 Elementary Statistics	—	3
	16-17	16-17

Sixth Semester

	B.A.	B.S.
Bio 397 Seminar*	1	1
Bio Elective/Research	3	3
Phy 172 Introductory Physics II	4	4
Distribution Requirements	6	6
Computer Science Elective	3	3
	16-17	16-17

*Only one semester of Bio 397 is required but it must be taken in either the fifth or sixth semester.
**Any course other than a biology course.

Seventh Semester

	B.A.	B.S.
Bio 391 Senior Research Projects	1	1
Bio Electives	3	6
Distribution Requirements	6	6
Free Electives**	6	3
	16	16

Eighth Semester

	B.A.	B.S.
Bio 392 Senior Research Projects	2	2
Bio Electives	3	6
Distribution Requirement	3	3
Free Electives**	9	6
	17	17

**Any course other than a biology course.

BIO 105. HUMAN BIOLOGY — **Three credits**

This course provides a general study of the anatomy and physiology of the human body as well as the interrelationships between humans and the environment. This course is only open to non-science majors. Lecture, two hours per week; laboratory, two hours per week. Laboratory fee: $40.

Offered every fall semester.

BIO 106. CONTEMPORARY ISSUES IN BIOLOGY — **Three credits**

Contemporary Issues in Biology covers selected biological, environmental, and health problems currently faced by mankind, and emphasizes their relevance to basic concepts in modern biology (including such topics as the chemistry of life, the structure and function of cells, genetic code, evolution and natural selection, biological diversity, population biology and ecology). Open only to non-science majors. Lecture, three hours per week.

Offered in alternate years.

BIO 107. PLANTS AND HUMAN AFFAIRS — **Three credits**

An examination of plants and their past and present interrelationships with humans. Topics will include: an overview of plant form, function and diversity; ways that plants are used by various societies; detrimental plants; plant propagation; and the importance of plants in the ecosystem. Only open to non-science majors. Two hours of lecture and two hours of laboratory per week. Laboratory fee: $40.

Offered in alternate years.

BIO 108. PRINCIPLES OF GENE MANIPULATION — **Three credits**

Principles of Gene Manipulation provides a foundation in molecular genetics, with emphasis on the organization, expression and regulation of genetic information, and on application of recombinant genetic technologies to address problems in medicine, agriculture and industry. Available for Area II credit only to non-science majors. Two hours of lecture and three hours of laboratory per week. Fee: $40.

Offered in alternate years.

BIO 113. MICROBIOLOGY — **Four credits**

This course presents the basic principles of bacteriology and the relationship of micro-organisms to disease and its prevention, control, and treatment. It considers the effects of microbes within the body and the body's reaction to them. Lecture, three hours a week; laboratory, three hours a week. Laboratory fee: $40.

Offered every fall semester.

BIO 115-116. HUMAN ANATOMY AND PHYSIOLOGY — **Four credits each**

This course provides a general study of the human body, its structure and normal function. It provides an appreciation of the complex nature of the human body with relation to the promotion of a healthy organism. Lecture, three hours a week; laboratory, three hours a week. Laboratory fee: $40 each course.

Bio 115. Offered every fall semester.

Bio 116. Offered every spring semester.

BIO 121. PRINCIPLES OF MODERN BIOLOGY I — **Four credits**

An introduction to concepts of modern biological science for students majoring in biology and other sciences. Course will focus on the structure and function of living matter. A heavy emphasis will also be given to the anatomy and physiology of plants. Three hours of lecture, three hours of laboratory, one hour of discussion per week. Laboratory fee: $40.

Corequisite: Chm 115.

Offered every fall semester.

BIO 122. PRINCIPLES OF MODERN BIOLOGY II — **Four credits**

A continuation of Biology 121. Topics include: the structure and function of the vertebrate animal, the causes and nature of biological diversity and concepts of ecology. Three hours of lecture, three hours of laboratory, one hour of discussion per week. Laboratory fee: $40.

Prerequisite: Bio 121.

Offered every spring semester.

BIO 225. POPULATION AND EVOLUTIONARY BIOLOGY — **Four credits**

This course emphasizes the patterns and processes of evolutionary change in living systems in an ecological context. It reviews the basic characteristics and dynamics of populations, and the relevance of population ecology and population genetics to the evolution of species. Human evolution, sociobiology and other controversial issues are also covered. Laboratory exercises emphasize an experimental approach to more in-depth study of specific topics covered in lecture. Three hours of lecture, three hours of laboratory, and one hour of discussion per week. Required of all biology majors. Fee: $40.

Prerequisite: Bio 121-122.

Offered every fall semester.

BIO 226. CELLULAR AND MOLECULAR BIOLOGY — **Four credits**

Cell structure in relation to function. Biochemistry and physiology of animal, plant, and bacterial cells and their viruses are presented in a molecular biology context. The cell in division and development. Three lectures, one discussion, and one three-hour laboratory per week. Laboratory fee: $40.

Prerequisite: Bio 121-122, 225.

Offered every spring semester.

BIO 304. LIFE OF THE VERTEBRATES — **Three credits**

This course presents a view of chordate animals with particular emphasis on the natural history, evolution, and classification of these forms. Lecture, two hours; laboratory, three hours a week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered in alternate years.

BIO 306. INVERTEBRATE BIOLOGY — **Four credits**

This course is a study of the major invertebrate phyla with respect to their taxonomy, evolution, morphology, physiology, and ecology. Lecture, three hours a week; laboratory, three hours a week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered in alternate years.

BIO 311. COMPARATIVE PHYSIOLOGY **Four credits**

Comparative Physiology encompasses the study of organ functions and organ system functions in different animal groups. Emphasis will be on the systemic physiology of vertebrate animals. Lecture, three hours; laboratory, three hours a week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered in alternate years.

BIO 312. PARASITOLOGY **Four credits**

Parasitology is the study of organisms that live on or within other organisms and the relationship of these organisms to their hosts. This course deals with the common parasites that infect man and other animals. Lecture, three hours; laboratory, three hours a week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered in alternate years.

BIO 314. COMPARATIVE VERTEBRATE ANATOMY **Four credits**

This course deals with the evolution and anatomy of the organ systems of vertebrates. Lectures survey the comparative anatomy of the vertebrate classes. Laboratory dissections include the Lamprey, Shark, and Cat in detail. Lecture three hours per week, laboratory three hours per week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226.

Offered every spring semester.

BIO 321. MAMMALIAN PHYSIOLOGY **Four credits**

This course examines the function of mammalian systems with regard to homeostasis, growth and reproduction. Emphasis is on human physiology; however, other mammalian systems are discussed to demonstrate physiological adaptability to various environmental situations. Lecture, three hours; laboratory, three hours per week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered in alternate years.

BIO 323. FUNCTIONAL HISTOLOGY **Four credits**

This course emphasizes the microscopic examination of mammalian tissues from morphological and physiological perspectives. Reference is made to organ embryogenesis to support the understanding of organ form and function. Tissue preparation for histological examination is demonstrated. Lecture, three hours; laboratory, three hours per week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered in alternate years.

BIO 324. MOLECULAR BIOLOGY **Three credits**

Molecular Biology is the study of the energetics, metabolism, and biochemical aspects of living systems. A general biochemical presentation will be provided with reference to proteins, carbohydrates, and lipids with extensive coverage of molecular genetics. Lecture, three hours a week.

Prerequisites: Bio 121-122, 225-226, Chm 231-232, or permission of instructor.

Offered every spring semester.

BIO 326. IMMUNOLOGY AND IMMUNOCHEMISTRY **Four credits**

This course is concerned with the biologic mechanisms and chemistry of reactants and mediators associated with natural and acquired states of immunity, tissue and blood serum responses to infection and immunization, and related patho-physiologic alterations of hypersensitivity phenomena in vertebrate animals and man. Three lectures and one three-hour laboratory per week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered every spring semester.

BIO 327. BACTERIOLOGY **Four credits**

Bio 327 is a general introductory course covering the morphology and growth of bacteria, sterilization, and applied uses of bacteria. The laboratory work covers techniques of staining, culturing, and biochemical testing for the identification of bacteria. Lecture, three hours a week; laboratory, three hours a week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered every fall semester.

BIO 328. DEVELOPMENTAL BIOLOGY **Three credits**

A course dealing with principles of organismic development, gametogenesis, fertilization, cleavage, embryogenesis, differentiation, morphogenesis, regeneration. Laboratory work includes vertebrate embryology, microtechnique, and some experimentation. Lecture, two hours; laboratory, three hours a week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered in alternate years.

BIO 341. LIMNOLOGY **Three credits**

A study of the chemical, physical, and biological aspects of freshwater systems. Laboratory investigations will consist of in-depth analyses of local lakes and streams. Lecture, two hours; laboratory, three hours. Laboratory fee: $45. (Same as GES 340)

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered in alternate years.

BIO 343. MARINE ECOLOGY **Three credits**

An examination of the biology of marine life within the context of modern ecological principles. The structure and physiology of marine organisms will be studied from the perspectives of adaptation to the ocean as habitat, biological productivity, and interspecific relationships. Emphasis will be placed on life in intertidal zones, estuaries, surface waters, and the deep sea. Two hours of lecture and three hours of laboratory per week. Fee: $45. (Same as GES 342)

Prerequisites: GES 230 (Ocean Science) and Bio 121-122 or junior biology major status. Students must have formal course experiences in oceanography and biology at the science major level **or** have completed their sophomore year as a biology major.

Offered in alternate years.

BIO 344. ECOLOGY **Four credits**

Ecology examines contemporary ecological thinking as it pertains to the interrelationships of organisms and their environments. Interactions at the population and community level are emphasized. Lecture, three hours; laboratory, three hours a week. Laboratory fee: $40. (Cross-listed with GES 317)

Prerequisites: Bio 121-122, or permission of instructor.

Offered in alternate years.

BIO 345. GENETICS **Four credits**

Genetics will present a detailed treatment of genetics beyond the introductory level with particular emphasis on populational and molecular aspects of heredity. Topics will include plant and human genetics. Lecture, three hours; laboratory, three hours a week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered every fall semester.

BIO 346. ANIMAL BEHAVIOR **Four credits**

Animal Behavior is a course emphasizing behavior as the response of an organism to physical and social environmental change, and covering the processes that determine when changes in behavior occur and what form the changes take. Laboratories, using local fauna, demonstrate principles discussed in lecture. Lecture, three hours; laboratory, three hours a week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered in alternate years.

BIO 348. EVOLUTION — **Three credits**

Evolution is the study of living things with time. Theories relating to the origin of life, natural selection, and speciation as processes of organic evolution are emphasized. Lecture, three hours a week. Field trip fee: $20.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered in alternate years.

BIO 361. PLANT FORM AND FUNCTION — **Four credits**

An introduction to the morphology, anatomy, cytology and physiology of plants, with emphasis on the vascular plants. Structural and functional aspects of plants will be interpreted in relation to each other and within ecological and evolutionary contexts. Lecture, three hours per week; laboratory, three hours per week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered every fall semester.

BIO 362. PLANT DIVERSITY — **Four credits**

A comprehensive survey of bryophytes, vascular plants and plantlike organisms (fungi and algae) emphasizing their structure, reproductive biology, natural history, evolution, and importance to humans. Lecture, three hours per week; laboratory, three hours per week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

Offered every spring semester.

BIO 366. FIELD BOTANY — **Three credits**

This is a specialized summertime field course which emphasizes a taxonomic, phylogenetic, and ecological survey of higher plants indigenous to Northeastern Pennsylvania. Due to the extensive field work, enrollment is somewhat more restricted than in other courses; therefore, written permission from the instructor is the prime prerequisite of those upperclassmen wishing to register for the course. (Cross-listed with GES 385)

Prerequisites: Bio 121-122, or permission of instructor.

BIO 368. MEDICAL BOTANY — **Three credits**

A specialized summertime course that provides a scientifically-based overview of the ways that plants affect human health. Topics include cultural and historical perspectives of plants and medicine, plants that cause human ailments, plants that cure human ailments, and psychoactive plants. Lecture two hours per day for five weeks.

Prerequisites: Bio 121-122, 225, Chm 231-232 or permission of instructor.

BIO 391-392. SENIOR RESEARCH PROJECTS — **One credit, two credits**

The student will pursue independent research as a member of a team of senior biology majors. Each team will be responsible for the identification of an original research problem, a thorough literature review of the problem, a detailed prospectus prepared in the format of a grant proposal, complete execution of the research project, a formal oral presentation, and a final manuscript prepared in standard journal format. Senior research is required of all biology majors seeking a four-year degree in biology.

Prerequisite: Open only to senior biology majors.

Bio 391. Offered every fall semester.

Bio 392. Offered every spring semester.

BIO 394. BIOLOGICAL FIELD STUDY — **One to three credits**

On-site study of biological problems or situations incorporating field documentation and investigation techniques. May be repeated for credit when no duplication of experience results. One hour of lecture per week plus field trip. Fee: variable.

Prerequisites: Bio 121-122, or permission of instructor.

BIO 395-396. INDEPENDENT RESEARCH — **One to three credits**

This course involves independent study and research for advanced students in the field of the major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required; it must also be orally presented at an appropriate off-campus science meeting.

Prerequisite: Written approval of department chairperson is required. Candidates for Independent Research must have a minimum GPA of 3.00 and be of upper class standing.

BIO 397. SEMINAR — **One credit**

Presentations and discussions of selected topics.

Prerequisite: Junior-level standing.

Offered every fall and every spring semester.

BIO 399. COOPERATIVE EDUCATION — **One to six credits**

Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 minimum cumulative average, consent of academic advisor, approval of placement by department chairperson.

BIO 198/298/398. TOPICS — **Variable credit**

A study of topics of special interest not extensively treated in regularly offered courses.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.

BIO 425. ELECTRON MICROSCOPY FOR LIFE SCIENCES — **Three credits**

A comprehensive course in the basic principles and practice of scanning electron microscopy plus introductions to older and newer types of electron microscopy. Lectures and laboratories emphasize scanning electron microscopy techniques for students preparing their own biological specimens and recording their own electron micrographs. Lecture, two hours a week; laboratory, three hours a week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226, or permission of department chairperson.

Offered in alternate years.

BUSINESS ADMINISTRATION

Associate Professor Raspen, Chairperson; Professors Emeriti Farrar, Gera; Professor Giamartino; Associate Professors Batory, Engel, Liuzzo, O'Hop, Peper, Schwartz, Seeley; Assistant Professor Loftus.

Total minimum number of credits required for a Bachelor of Business Administration degree — 127.

Total minimum number of credits required for a minor — 24.

The Business and Economics Department offers undergraduate and graduate degree programs in business administration with a variety of concentrations leading to executive, managerial and technical careers in business, industry, and governmental organizations. Students interested in pursuing graduate or professional studies will find that the curriculum provides the appropriate foundation for such opportunities.

The Business Administration curriculum is composed of three tiers or steps intended to combine simultaneously a rigorous general education with the flexibility of individualized program design. The first tier is the liberal arts General Education Requirements of the University core. As explained on pages 48-50 of this **Bulletin,** this tier consists of 45 credits — 6 credits in written expression (English 101 and English 102 or a higher sequence) and 39 credits in the "Distribution Areas:" **Area I: Heritage and Value – 15 credits; Area II: The Scientific World — 12 credits; Area III: Society and Human Behavior — 9 credits; and Area IV: Artistic Expression – 3 credits.** To become competitive, effective, organizational leaders and self-fulfilled individuals, Business Administration graduates are expected to possess the skills and knowledge acquired through this liberating exposure to the arts, sciences, mathematics, and the humanities.

The second tier of the curriculum is the Business Administration core of 48 credits. This core transmits a common educational experience to all business administration majors by addressing topics that are recognized to be basic and necessary to all practicing professionals. Although the following nineteen courses are required by the Business Administration core, four of them fulfill Distribution Area requirements of the University core and so are counted in the first tier grouping. They appear here for completeness:

Acc 101	Introductory Financial Accounting
Acc 102	Introductory Managerial Accounting
BA 101	Introduction to Business
BA 233	The Legal Environment of Business
BA 319	Business Statistics
BA 321	Marketing
BA 341	Managerial Finance
BA 351	Management of Organizations
BA 352	Production and Operations Management
BA 353	Human Resource Management
BA 354	Organizational Behavior
BA 356	The Social Responsibility of Business
BA 357	Management Information Systems
BA 358	International Business Seminar
BA 360	Business Policy and Decision-Making Seminar
Com 101 }	Public Speaking or
Com 206 }	Business & Professional Speaking
CS 115	Survey of Computers **(Distribution Area II)***
Ec 101	Economics I **(Distribution Area III)***
Ec 102	Economics II **(Distribution Area III)***
Mth 105	Calculus I **(Distribution Area II)***

*Meet requirements in the University core.

The third and final tier is represented by what is known as a "concentration area," in which each major must complete a minimum of 15 credits by taking at least five courses from a menu of offerings in at least one of the six concentration areas offered. This is the stage at which students can select the area of emphasis and courses that focus upon their personal career goals and ambitions. Included in the six concentration areas are Banking and Finance, Economics, Health Services Administration, International Business, Management, and Marketing (see pages 101-103 for a complete description of these concentration areas).

The Bachelor of Business Administration degree program also contains nineteen credits of free electives for further customization of one's educational program. A student who wishes to declare a minor in areas such as computer science, communications, foreign languages, political science, psychology, or sociology, can easily do so. Through a judicious selection of elective concentration courses and use of the free electives courses, it is possible for a student to fulfill multiple concentrations without the necessity of adding extra credits or extra semesters to one's program. Academic, personal, and career advisors are available to assist students in the selection of concentration areas and coursework. In much the same way, minors, double majors, or a personalized package of electives can be constructed around the interests of the students with the concerned, caring advice of these counselors.

For majors in other disciplines, the Business and Economics Department offers the minor program in Business Administration with concentrations in Finance, Marketing, Management, and Quantitative Business Analysis, as explained on page 103. Thus, students who may be contemplating a career in business as a means of fully utilizing their already chosen majors will find that the Business Administration minor can be customized to complement their other academic and career interests.

Business Administration alumni can be found in positions of leadership in organizations throughout the world. They are leaders in both the public and private sectors. In addition, our alumni are educators, researchers, scholars, entrepreneurs, attorneys, and other professionals.

For the next generation of executives and professionals seeking similar realizations of their ambitions, the Bachelor of Business Administration degree program at Wilkes will prepare them admirably for their demanding futures as leaders in the twenty-first century of our global and diverse environment.

Within the School of Business, Society, and Public Policy are housed the U.S. Small Business Development Center and the Allan P. Kirby Center for Free Enterprise and Entrepreneurship. Both units provide academic and experiential opportunities for business students to apply what they study in classroom settings to functioning organizations under the direction of senior professional staff at each unit.

The following course sequence is recommended for students pursuing the Bachelor of Business Administration degree. By following this recommendation, all University core and Departmental core requirements will be completed in their proper sequences. Students transferring into Wilkes and/or the Bachelor of Business Administration degree program can use this semester-by-semester outline as guidance for completing coursework.

Recommended Course Sequence for a Major in Business Administration

First Semester		Second Semester	
BA 101 Introduction to Business	3	COM 101 Public Speaking or COM 206 Business & Prof. Speaking	3
CS 115 Survey of Computers **(Dist)**	3	Ec 102 Principles of Economics II **(Dist)**	3
Ec 101 Principles of Economics I **(Dist)**	3	Eng 102 Composition II	3
Eng 101 Composition I	3	Mth 105 or 111 Calculus I **(Dist)**	4
Distribution Requirement	3	Distribution Requirement	3
PE 100 Activity	0	PE 100 Activity	0
	15		16

Third Semester		Fourth Semester	
Acc 101 Intro. Financial Accounting	3	Acc 102 Intro. Managerial Accounting	3
BA 233 Legal Environment of Business	3	Distribution Requirements	9
Distribution Requirements	9	Free Elective	3
	15		15

Fifth Semester		Sixth Semester	
BA 319 Business Statistics	3	BA 341 Managerial Finance	3
BA 321 Marketing	3	BA 352 Production & Operations Mgt.	3
BA 351 Management of Organizations	3	BA 353 Human Resource Management	3
BA 356 Social Responsibility	3	BA 354 Organizational Behavior	3
Distribution Requirement	3	Concentration Elective	3
Free Elective	3	Free Elective	3
	18		18

Seventh Semester		Eighth Semester	
BA 358 International Business Seminar	3	BA 357 Mgt. Information Systems	3
Concentration Electives	9	BA 360 Business Policy and Decision-Making Seminar	3
Free Elective	3	Concentration Elective	3
	15	Free Electives	6
			15

Bachelor of Business Administration Degree

CONCENTRATION AREAS

NOTE: Students who pursue the Bachelor of Business Administration degree must fulfill **at least one** of the following six concentration areas by completing the appropriate set of courses. In each concentration area, all of the five courses may be selected from *Section A — Primary Concentration Electives;* alternatively, as many as two of the five courses may be selected from *Section B — Ancillary Concentration Electives.*

BANKING AND FINANCE

Section A — Primary Banking and Finance Concentration Electives — 9 to 15 credits:

- Acc 321 Taxes
- BA 240 Property Insurance
- BA 343 Investments
- BA 395-396 Independent Research in Banking/Finance
- BA 398 Topics in Banking/Finance
- Ec 201 Macroeconomics I
- Ec 230 Money and Banking
- Ec 330 Public Finance
- Mth 106 **or** 112 Calculus II

Section B — Ancillary Banking and Finance Concentration Electives — 0 to 6 credits:

- BA 209 Business Correspondence and Reports
- BA 212 Government and Business
- BA 220 Real Estate
- BA 241 Life and Health Insurance
- BA 372 Health Care Finance and Reimbursement Principles
- BA 399 Cooperative Education in Banking/Finance
- Ec 202 Microeconomics I
- Ec 203 Macroeconomics II
- Ec 310 Economic Development
- Ec 340 International Trade
- PS 321 Public Budgeting

ECONOMICS

Section A — Primary Economics Concentration Electives — 9 to 15 credits:

- Ec 201 Macroeconomics I
- Ec 202 Microeconomics I
- Ec 301 Comparative Economic Systems
- Ec 310 Economic Development
- Ec 395-396 Independent Research in Economics
- Ec 330 Public Finance
- Ec 340 International Trade
- Ec 380 Labor Economics
- Ec 385 Collective Bargaining
- Ec 398 Topics in Economics
- Mth 106 **or** 112 Calculus II

Section B — Ancillary Economics Concentration Electives — 0 to 6 credits:

- BA 212 Government and Business
- Ec 203 Macroeconomics II
- Ec 204 Microeconomics II
- Ec 311 Economic Geography of North America, Europe, and the former Soviet Union
- Ec 312 Economic Geography of Asia, Africa, and Latin America
- Ec 330 Economic Cycles
- Ec 397 Seminar
- Ec 399 Cooperative Education in Economics

HEALTH SERVICES ADMINISTRATION

Section A — Primary Health Services Administration Concentration Electives — 9 to 15 credits:

- BA 371 The U.S. Health Care System
- BA 372 Health Care Finance and Reimbursement Principles
- BA 373 Administration and Management of Health Care Organizations
- BA 374 Seminar on Health Care Mgt.
- BA 395-396 Independent Research in Health Serv. Administration
- BA 398 Topics in Health Services Administration

Section B — Ancillary Health Services Administration Concentration Electives — 0 to 6 credits:

Acc 311 Cost Accounting
Acc 341 Financial and Managerial Accounting Systems
BA 209 Business Correspondence and Reports
BA 241 Life and Health Insurance
BA 399 Cooperative Education (in a Health Services placement)
COM 202 Interpersonal Communication
COM 203 Small Group Communication
COM 302 Public Relations
Ec 223 Collective Bargaining
Phl 214 Medical Ethics
PE 210 Contemporary Health Concepts
PS 211 State & Local Government
PS 221 Intergovernmental Relations
Psy 243 Industrial Psychology
Soc 262 The Sociology of Work
Soc 361 Medical Sociology

INTERNATIONAL BUSINESS

Section A — Primary International Business Concentration Electives — 9 to 15 credits:

BA 209 Business Correspondence and Reports
Ec 301 Comparative Economic Systems
Ec 310 Economic Development
Ec 311 Economic Geography of North America, Europe, and the former Soviet Union
Ec 312 Economic Geography of Asia, Africa, and Latin America
Ec 340 International Trade
BA 395-396 Independent Research in International Business
BA 398 Topics in International Business

Section B — Ancillary International Business Concentration Electives — 0 to 6 credits:

BA 212 Government and Business
BA 399 Cooperative Education in International Business
Hst 328 United States Foreign Policy
Hst 356 Europe in the 20th Century
Hst 361-362 History of the Far East
Hst 348 History of Russia
PS 141 International Politics
PS 251 European Politics
PS 253 Politics in Non-Industrialized Nations
PS 342 International Law and Organization
PS 351 Politics of Russia and the CIS

MANAGEMENT

Section A — Primary Management Concentration Electives — 9 to 15 credits:

BA 209 Business Correspondence and Reports
BA 212 Government and Business
BA 327 Logistics and Distribution Management
BA 343 Investments
BA 395-396 Independent Research in Management
BA 398 Topics in Management
Mth 363 Operations Research
COM 202 Interpersonal Communication
COM 206 Business/Professional Speaking
COM 303 Organizational Communication

Section B — Ancillary Management Concentration Electives — 0 to 6 credits:

Acc 311 Cost Accounting
BA 240 Property/Casualty Insurance
BA 241 Life and Health Insurance
BA 326 Sales Management
BA 373 Administration and Management of Health Care Organizations
BA 399 Cooperative Education in Management
Ec 380 Labor Economics
Ec 385 Collective Bargaining
Mth 106 **or** 112 Calculus II
PS 121 Public Administration
Psy 232 Human Behavior
Psy 243 Industrial Psychology
Soc 262 Sociology of Work

MARKETING

Section A — Primary Marketing Concentration Electives — 9 to 15 credits:

BA 209 Business Correspondence and Reports
BA 322 Advertising
BA 323 Salesmanship
BA 324 Principles of Retailing
BA 325 Retail Buying
BA 326 Sales Management
BA 327 Logistics and Distribution Management
BA 328 Consumer Behavior
BA 395-396 Independent Research in Marketing
BA 398 Topics in Marketing

Section B — Ancillary Marketing Concentration Electives — 0 to 6 credits:

BA 212 Government and Business
BA 240 Property & Liability Insurance
BA 241 Life and Health Insurance
BA 399 Cooperative Education in Marketing
Ec 310 Economic Development
Ec 340 International Trade
Eng 202 Technical Writing
Mth 106 **or** 112 Calculus II
Psy 221 Developmental Psychology **or**
Psy 232 Human Behavior
COM 102 Principles of Communication
COM 202 Interpersonal Communication
COM 206 Business/Professional Speaking
COM 302 Public Relations
COM 352 Advanced Public Relations

Business Administration Minor

The Business and Economics Department offers the Minor program in Business Administration, upon the completion of the appropriate 24 credits, in one of the four concentration areas listed below: **Finance, Marketing, Management,** and **Quantitative Business Analysis.** Economics 101 and 102 are required courses for the Business Administration minor and are included in the 24 credit hour requirement. (**Note:** Students who major in Business Administration may **not** pursue a minor program in Business Administration, regardless of concentration areas.)

Students contemplating pursuit of the Master of Business Administration degree are advised to complete the Management concentration, since that area includes many of the undergraduate courses commonly required for entry into most MBA programs.

Prerequisite to all minor concentrations: Ec 101, Ec 102; Total credits required for minor degree in Business Administration — 24, including Ec 101 and Ec 102.

Finance Minor Concentration

Required: Acc 101 Introductory Financial Accounting
Acc 102 Introductory Managerial Accounting
BA 341 Managerial Finance
BA 343 Investments

And any two of the following Electives:

Acc 321 Taxes
BA 240 Property and Liability Insurance
BA 241 Life and Health Insurance
Ec 330 Public Finance
Ec 340 International Trade and Finance

Management* Minor Concentration

Required: Acc 101 Introductory Financial Accounting
Acc 102 Introductory Managerial Accounting
BA 351 Management of Organizations

And any three of the following Electives:

BA 233 The Legal Environment of Business
BA 319 Business Statistics
BA 321 Marketing
BA 341 Managerial Finance
BA 352 Productions and Operations Management
BA 353 Human Resources Management
BA 354 Organizational Behavior
BA 356 The Social Responsibility of Business
BA 357 Management Information Systems
BA 358 Seminar on International Business Management
BA 360 Business Policy & Decision-Making Seminar

*Many of the undergraduate courses commonly required for admission to Master of Business Administration degree programs are included in this concentration.

Marketing Minor Concentration

Required: BA 321 Marketing

And any five of the following Electives:

BA 233 The Legal Environment of Business
BA 322 Advertising
BA 323 Salesmanship
BA 324 Principles of Retailing
BA 325 Retail Buying
BA 326 Sales Management
BA 327 Logistics and Distribution Management
BA 328 Consumer Behavior
BA 398 Topics in Marketing
COM 302 Public Relations

Quantitative Business Analysis Minor Concentration

Required: BA 319 Business Statistics
BA 352 Production and Operations Management
BA 357 Management Information Systems

And any three of the following Electives:

BA 327 Logistics and Distribution Management
BA 341 Managerial Finance
BA 343 Investments
Ec 201 Macroeconomics I
Ec 202 Microeconomics I
Mth 363 Operations Research

BA 101. INTRODUCTION TO BUSINESS **Three credits**

Designed to orient students to the framework within which business enterprises function in the economy. Stress is placed on organization and management of the enterprise, decision-making within the enterprise, small business operations, and problems of financial resources.

BA 209. BUSINESS CORRESPONDENCE AND REPORTS **Three credits**

An emphasis on written communications: practice in writing major classification of business letters; persuasive requests and refusals, inquiry, order, sales, application, credit, collection, and goodwill letters. Investigative techniques of research and analytical report writing. Designated writing intensive.

Prerequisite: Junior standing.

BA 212. GOVERNMENT AND BUSINESS **Three credits**

A study of the relationship of government to economic enterprises with special attention to conditions in the United States; the regulatory activities of government agencies; administrative methods, objectives, and results of governmental control. Reference is made to monopoly and quasi-monopoly situations, public utilities, trusts, transportation, extractive industries, and public enterprise.

BA 220. REAL ESTATE **Three credits**

Economic theories of value applied to real estate, valuation as a guide to decisions, market analysis, real estate, finance, property development and management, locational theory and site selection.

BA 233. THE LEGAL ENVIRONMENT OF BUSINESS **Three credits**

This course provides a foundation for business managers to operate within the legal environment in which all businesses in our society function. It provides an overview of law and our legal system, the lawmaking and adjudicatory processes, and the roles of economic, social, and political forces in the shaping of constraining legal rules and regulations.

Prerequisite: Sophomore standing.

BA 234. BUSINESS LAW AND ETHICAL RESPONSIBILITY **Three credits**

An in-depth study of contracts, commercial transactions, the Uniform Commercial Code, business organizations, property law, liability of accountants, and debtor-creditor relationships. Provides the necessary legal background for those entering the accounting profession.

Prerequisite: BA 233.

BA 240. PROPERTY AND LIABILITY INSURANCE **Three credits**

A study of the principles of property and liability insurance applied to the needs of individuals and organizations. Course content includes risk management, types of insurance and public policy issues.

BA 241. LIFE AND HEALTH INSURANCE **Three credits**

A study of the principles of life and health insurance on both an individual and group basis. Course content includes types of insurance, insurer operations and public policy issues.

BA 319. BUSINESS STATISTICS **Three credits**

An introduction to the primary tools of research in business and economics; the collection, summarization, analysis, and interpretation of statistical findings relevant to business decisions. Two hours of lecture and one hour of individualized laboratory. Topics covered will include, but not be limited to, descriptive statistics, probability, sampling theory, hypothesis testing, and regression and correlation analysis. (Cross-listed as EC 313.)

Prerequisites: Mth 105 or higher course.

BA 321. MARKETING **Three credits**

An introduction to the planning and activities of marketing. Emphasis on budgeting, product conception and development, pricing, distribution channels and promotion.

Prerequisite: Junior/Senior standing.

BA 322. ADVERTISING — **Three credits**

A managerial analysis of the decisions involved in advertising. Topics include research, ethics, campaign design, copy, art, media, budgeting, and effectiveness.

Prerequisite: BA 321.

BA 323. SALESMANSHIP — **Three credits**

The role of salesmanship in the economic system and motives behind all buying. The principles and art of selling with emphasis on industrial selling; the techniques of prospecting, presentation, handling objections, closing, follow-through including sales demonstration.

Prerequisite: BA 321.

BA 324. PRINCIPLES OF RETAILING — **Three credits**

A basic course that discusses opportunities in retailing; types of retail institutions; problems of store policy, store location; study of organizational structure of department stores; organization and functions of all store divisions.

Prerequisite: BA 321.

BA 325. RETAIL BUYING — **Three credits**

A study of the principles of what, when, and how much to buy; a study of customer demand. Special attention is given to the technique of buying; markups, markdowns, stock turns, and other factors that are necessary to keep lines complete.

Prerequisite: BA 324.

BA 326. SALES MANAGEMENT — **Three credits**

The course is designed to analyze and evaluate decisions facing sales managers in assessing the sales force. By utilizing planning, organizing and implementing skills, the sales manager can develop effective sales plans and programs.

Prerequisite: BA 321.

BA 327. LOGISTICS AND DISTRIBUTION MANAGEMENT — **Three credits**

Development and organization of the domestic and international transportation system; regulatory considerations. Distribution management practices; e.g., rates, routes, scheduling, services, insurance, materials handling, warehousing.

Prerequisite: BA 321.

BA 328. CONSUMER BEHAVIOR — **Three credits**

This course presents a survey and integration of concepts and theories that help explain or predict consumer behavior. Emphasis is on the implications of this information for marketing planning.

Prerequisite: BA 321.

BA 341. MANAGERIAL FINANCE — **Three credits**

A study of the financial theories and decision-making models relating to: financial analysis and planning; working capital management; cash budgeting; capital asset acquisitions; capital asset financing; cost of capital; capital structuring; acquisitions; divestitures; and reorganizations.

Prerequisite: Junior/Senior standing.

BA 343. INVESTMENTS — **Three credits**

A survey of the features and characteristics of investment instruments; the operation and regulation of security markets; the techniques of security analysis and valuation; financial intermediaries; modern and traditional portfolio theory and management.

Prerequisite: Junior/Senior standing.

BA 351. MANAGEMENT OF ORGANIZATIONS — **Three credits**

Introduction to the theory and practice of managing organizations, including planning, organizing, and controlling. Interdisciplinary in nature, social and ethical dimensions of managing are examined.

Junior standing.

BA 352. PRODUCTION AND OPERATIONS MANAGEMENT — **Three credits**

Principles of decision-making, systems design, introduction to quantitative tools of analysis; fundamentals of production, inventory, financial, and distribution management.

Prerequisite: BA 313 and BA 351.

BA 353. HUMAN RESOURCES MANAGEMENT — **Three credits**

A survey of the activities and decision-making functions of the human resources manager, including manpower planning, employee rights, EEOC dealings, training and development, employee evaluation techniques, compensation packages, and personnel recruitment.

Prerequisite: BA 351.

BA 354. ORGANIZATIONAL BEHAVIOR — **Three credits**

A behavioral science approach to understanding individual, formal, and informal group behavior; macro- and micro-organizational structures, motivation and leadership theories, group influences, conflicts, decision-making, communication, with emphasis on behavioral science applications in developing organizational effectiveness.

Prerequisite: BA 351.

BA 356. THE SOCIAL RESPONSIBILITY OF BUSINESS — **Three credits**

A course dealing with the problems faced by managers in responding to issues such as: the kinds and extent of social responsibility to be assumed by businesses, employee rights, consumerism, and the balance of public and private interests.

Prerequisite: Junior standing.

BA 357. MANAGEMENT INFORMATION SYSTEMS — **Three credits**

This course introduces the fundamental concepts underlying the design, implementation, control, and evaluation of business-oriented computer based information systems, office automation, information reporting, and decision making.

Prerequisite: CS 115.

BA 358. SEMINAR ON INTERNATIONAL BUSINESS MANAGEMENT — **Three credits**

An introduction to the field of international business. The empirical dimensions of the world economy; business enterprise in international trade; trade channels; effects of economic, political and social environment on international management problems of international operations; the role of government in fostering international business. A substantial amount of writing is required.

Prerequisite: BA 351 and senior standing.

BA 360. BUSINESS POLICY AND DECISION-MAKING SEMINAR — **Three credits**

A capstone course that integrates the functional areas of business from the point of view of top management. Emphasis is on the role of management in the formation of strategic and long-range plans. A substantial writing component is included.

Prerequisite: BA 351 and senior standing.

BA 371. THE U.S. HEALTH CARE SYSTEM — **Three credits**

A survey of the health care delivery system in the United States and identification of key factors shaping and reshaping the delivery system. Examination of current forces that shape the health care system and affect administrative efforts to ensure quality, availability, and access to health care while containing costs.

BA 372. HEALTH CARE FINANCE AND REIMBURSEMENT PRINCIPLES — **Three credits**

The course addresses fundamentals of accounting practices, financial control, and budgeting for health care institutions, emphasizing institutional and departmental level requirements, including the reporting requirements of third party payers.

Prerequisite: Acc 121 or permission of the instructor.

BA 373. ADMINISTRATION AND MANAGEMENT OF HEALTH CARE ORGANIZATIONS — **Three credits**

The course is designed to build the skills of today's managers and department heads in health administration in the administrative process of planning, directing, staffing, controlling, and coordinating in the efficient delivery of health care to patients in a cost effective manner. The course explores recent developments in management theory and practice as applied to health care in order to develop a foundation of technical, human, and conceptual skills necessary for successful performance as a health care manager. Health care organizations are addressed as a socio-technical system.

BA 395-396. INDEPENDENT RESEARCH — **One to three credits**

Independent study and research for advanced students in the field of the major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.

BA 397. SEMINAR — **(Maximum of three credits per student) One to three credits**

Presentation and discussions of selected topics.

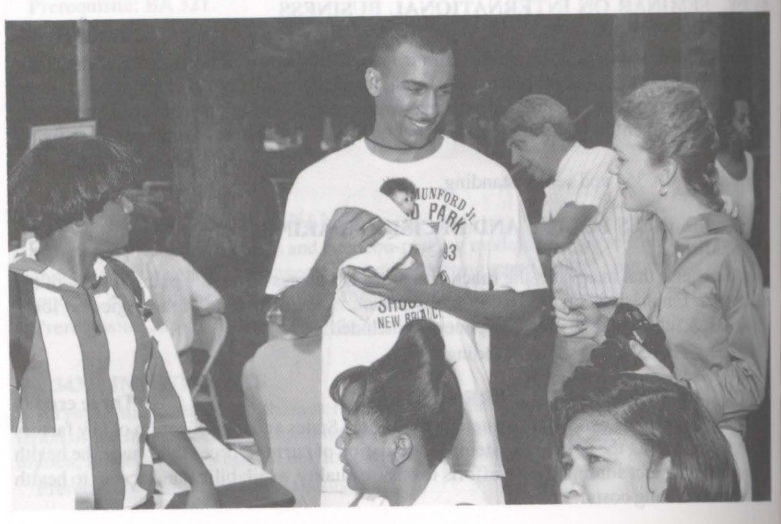
BA 399. COOPERATIVE EDUCATION — **One to six credits**

Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

BA 198/298/398. TOPICS — **Variable credit**

Lectures on subjects of special current interest in business which are not covered in other courses.



CHEMICAL ENGINEERING

Professor Bruns, Chairperson; Professors Cox, Redmond; Associate Professors Case, S. Halsor, Klemow, Walski; Assistant Professor Steele; Adjunct Faculty Smith, Winsor; Lab Director Oram; Lab Assistant C. Halsor.

The two-year program in Chemical Engineering is offered by the Department of GeoEnvironmental Sciences and Engineering. This program is specifically designed to provide a successful transfer of students to the junior year at other accredited engineering schools.

Recommended Course Sequence for Chemical Engineering

First Semester		Second Semester	
Chm 115 Elements and Compounds	4	Chm 118 Chemistry for Engineers	3
Mth 111 Calculus I	4	Mth 112 Calculus II	4
SSE 107 Technological Survival	3	EE 244 FORTRAN	3
ME 180 CADD Lab	1	Phy 201 General Physics I	4
Eng 101 Composition I	3	Eng 102 Composition II	3
PE 100 Activity	0	PE 100 Activity	0
	15		17

Third Semester		Fourth Semester	
Chm 231 Organic Chemistry I	4	Chm Elective (200 or above)	3-4
EE 211 Circuit Theory I	3	MAE 200 Materials Engineering	3
EE 283 Electrical Measurements Lab	1	MAE 284 Engineering Measurements Lab	1
Mth 211 Intro. to Differential Equations	4	Mth 212 Multivariable Calculus	4
Phy 202 General Physics II	4	Phy 203 General Physics III	3
Distribution Requirement	3	Distribution Requirement	3
	19		17-18

CHEMISTRY

Professor Faut, Chairperson; Professors Emeriti Bohning, Salley, Swain; Professors Rozelle, Stine; Associate Professor Phillips; Assistant Professor Wignot; Laboratory Manager Graves; Adjunct Professor Gregorek.

Total minimum number of credits required for a major in Chemistry leading to the B.S. degree — 125.
Total minimum number of credits required for a major in Chemistry leading to the B.A. degree — 122.
Total minimum number of credits required for a minor — 22.

The chemistry curriculum is designed to provide a comprehensive background in the fundamentals of the science and to contribute to the general education of the student. Graduates with a B.S. degree may find industrial or government employment or continue advanced studies in a graduate or professional school. The B.A. degree is available for students who need additional flexibility to prepare for a career in secondary education, the health professions (such as medicine, dentistry, or pharmacy), law, business, engineering, computer science, or other related areas. Utilizing existing courses and programs, it is also possible for a student to achieve a B.A. degree with a double major in chemistry and computer science. In all cases students will choose electives for the various career options after consultation with departmental advisors.

A minor in Chemistry consists of the completion of 22 credits in chemistry, including Chm 115 and Chm 116 (or Chm 118). Selection of other courses must be in keeping with the existing prerequisites as specified in this Bulletin.

Wilkes is approved by the American Chemical Society for the professional training of chemists. Students who complete the B.S. program may be certified for membership eligibility in the Society at graduation.

Required courses are indicated in the following suggested curricular outlines which are based on an extensive prerequisite structure. The order of the courses presented in this sequential arrangement is a suggested one. Changes in the order of the courses may be made on an advising basis.

Recommended Course Sequences for a Major in Chemistry

First Semester

	B.A.	B.S.
Chm 115 Elements and Compounds	4	4
Eng 101 Composition I	3	3
Mth 111 Calculus I	4	4
Distribution Requirement	3	3
PE 100 Activity	0	0
CS Elective	3	3
	17	17

Second Semester

	B.A.	B.S.
Chm 116 The Chemical Reaction	4	4
Eng 102 Composition II	3	3
Mth 112 Calculus II	4	4
Distribution Requirements	6	6
PE 100 Activity	0	0
	17	17

Third Semester

	B.A.	B.S.
Chm 231 Organic Chemistry I	4	4
Mth 211 Intro. Linear Algebra and Differential Equations	4	4
Distribution Requirement	3	3
Phy 201 General Physics	4	4
	15	15

Fourth Semester

	B.A.	B.S.
Chm 222 Systematic Inorganic Chemistry	4	4
Chm 232 Organic Chemistry II	4	4
Distribution Requirement	3	3
Phy 202 General Physics II	4	4
	15	15

Fifth Semester

	B.A.	B.S.
Chm 251 Physical Chemistry I	3	3
Chm 253 Physical Chemistry I Lab	0	1
Major Elective	0-3	3
Free Electives	6	6
Distribution Requirement	3	3
	12-15	16

Sixth Semester

	B.A.	B.S.
Chm 242 Applications of Instrumental Analysis	2	2
Chm 252 Physical Chemistry II	3	3
Chm 254 Physical Chemistry II Lab	0	1
Chm 342 Principles of Instrumental Analysis	2	2
Distribution Requirements	6	6
Free Elective	3	3
	16	17

Seventh Semester

	B.A.	B.S.
Chm 321 Advanced Inorganic Chemistry	0	3
Chm 323 Advanced Inorganic Chemistry Lab	0	1
Chm 391 Senior Research	1	1
Major Elective	0-3	3
Free Electives	12	9
	13-16	17

Eighth Semester

	B.A.	B.S.
Chm 392 Senior Research	2	2
Free Electives	9	9
Distribution Requirement	3	3
	14	14

Special Requirements

B.A. degree students must elect a minimum of two 300-level courses, one of which must be in the Chemistry Department.

B.S. degree students must elect a minimum of one 300-level course in addition to required 300-level courses, Chm 321, 323, 391-392.

Chemistry 391-392 are laboratory research courses. A student may obtain permission of the department to carry out a Senior Project which is not laboratory research. This permission will be granted only in exceptional cases.

Teacher certification students must satisfy the requirements described on pages 158-161, as they pertain to chemistry certification. The certification student must take an introductory biology course, must work in the Chemistry Department as a Laboratory Assistant for a minimum of one semester, and will be required to do certain special assignments related to teacher training in Chm 391.

All Chemistry majors must complete three credit-hours of Computer Science courses.

The Chemistry Department strongly recommends that students elect a foreign language to satisfy one of the General Education humanities requirements. The language of choice should be German, Russian, or French in that priority.

The Chemistry Department strongly recommends that students elect COM 101, Public Speaking.

All upper division Chemistry and Biochemistry majors are expected to attend Department seminars. Seniors must participate in the seminars to receive credit for Chm 391.

CHM 99. BASIC MATHEMATICS FOR INTRODUCTORY CHEMISTRY — No credit

A remedial course for students desiring an intensive survey of basic mathematical principles used in beginning chemistry courses. Topics include arithmetical operations, exponential notation, dimensional analysis, the writing and solving of equations, graphing, logarithms, and the use of a calculator.

CHM 101-102. CHEMICAL SCIENCE — Three credits each

Applications of chemistry in daily life, emphasizing nuclear chemistry, agricultural chemistry, and the chemistry of food and drugs. This course is primarily intended for students who take no other chemistry courses. It does **not** provide prerequisite background for any other chemistry course.

Prerequisite for Chm 102, Chm 101.

CHM 111. INTRODUCTION TO CHEMICAL REACTIONS AND PRINCIPLES — Four credits

Three major areas of emphasis will be developed: descriptive inorganic chemistry; acids, bases, and buffers; and radiochemistry. These areas will include gas laws, oxidation-reduction, equilibrium, stoichiometry, the periodic table, and solutions. Not open to chemistry majors. Class, three hours a week; laboratory, three hours a week; problem session, one hour a week. Fee: $40.

CHM 115. ELEMENTS AND COMPOUNDS — Four credits

Emphasis is placed on the periodic table and stoichiometry, including chemical properties, physical states, and structure. Class, three hours a week; laboratory, three hours a week; problem session, one hour a week. Fee: $40.

CHM 116. THE CHEMICAL REACTION — Four credits

A detailed study of chemical equilibria in aqueous solution. Class, three hours a week; laboratory, three hours a week; problem session, one hour a week. Fee: $40.

Prerequisite: Chm 115.

CHM 118. CHEMISTRY FOR ENGINEERS — Three credits

An introduction to chemical equilibria, electrochemistry, thermodynamics, chemical kinetics, and the chemistry of selected metals and nonmetals. Class, two hours a week; laboratory, three hours a week; problem session, one hour a week. Fee: $40.

Prerequisite: Chm 115, engineering majors only.

CHM 130. ORGANIC AND BIOLOGICAL CHEMISTRY — Four credits

An introduction to the structure and reactions of carbon compounds as a background for the study of interactions of biologically active compounds such as carbohydrates, proteins, and nucleic acids. Not open to chemistry majors. Lecture, three hours a week; laboratory, three hours a week; problem session, one hour a week. Fee: $40.

Prerequisite: Chm 111 or 115.

CHM 222. SYSTEMATIC INORGANIC CHEMISTRY — Four credits

A systematic description of the chemistry of the main group elements based on fundamental chemical principles. Fundamental techniques of inorganic synthesis. Class, three hours a week; laboratory three hours a week. Fee: $40.

Prerequisite: Chm 116.

CHM 231. ORGANIC CHEMISTRY I — Four credits

An introduction to the chemistry of carbon compounds which develops the theoretical principles underlying the mysterious "vital force" from which all organic materials were supposedly derived. These principles will be investigated and applied in the laboratory. Class, three hours a week; laboratory, three hours a week; pre-lab session, one hour a week. Fee: $40.

Prerequisite: Chm 116 or Chm 118.

CHM 232. ORGANIC CHEMISTRY II — Four credits

A continuation of Chm 231 with emphasis on modern organic syntheses. The laboratory integrates syntheses, isolation, analysis, and instrumentation. Class, three hours a week; laboratory, three hours a week; pre-lab session, one hour a week. Fee: $40.

Prerequisite: Chm 231.

CHM 242. APPLICATIONS OF INSTRUMENTAL ANALYSIS — Two credits

A laboratory course in the application of instrumental techniques for obtaining qualitative and quantitative information about the composition and structure of matter. Lab work includes chromatographic, spectroscopic and electrometric techniques, and the use of computers for data acquisition, management and analysis. The course serves students in biochemistry, chemistry, biology, geology, health-related sciences, engineering and environmental sciences who desire experience with these techniques and how they are used in chemical problem-solving. One 1.5 hour pre-lab session and one four hour lab period per week. Fee: $50.

Prerequisite: Chm 116 or Chm 118.

CHM 251. PHYSICAL CHEMISTRY I — Three credits

The first and second laws of thermodynamics are developed, leading to an emphasis on the applications of the free energy concept: electrochemistry, the phase rule, and colligative properties. Chemical kinetics is introduced. Class, three hours a week.

Prerequisites: Chm 116, Mth 106 or Mth 211, Phy 106 or Phy 202.

CHM 252. PHYSICAL CHEMISTRY II — Four credits

Elementary quantum theory, kinetic molecular theory, and nuclear chemistry are studied. The molecular orbital theory and other approximate methods of quantum theory are developed. Statistical mechanics and surface chemistry are introduced. Class, three hours a week.

Prerequisite: Chm 251.

CHM 253. PHYSICAL CHEMISTRY I LABORATORY — **One credit**

Laboratory experiments related to the subject matter of Chm 251 are carried out, including calorimetry, electrochemistry, gas laws, and kinetics. Statistics and data analysis are also covered. Must be taken concurrently with Chm 251 or with permission of the instructor. Laboratory, three hours a week; pre-lab, one hour a week. Fee: $40.

Prerequisites or Corequisites: Chm 251 or permission of instructor.

CHM 254. PHYSICAL CHEMISTRY II LABORATORY — **One credit**

Laboratory experiments related to the subject matter of Chm 252 are carried out, including kinetics, spectroscopy, and polymers. Must be taken concurrently with Chm 252 or with permission of the instructor. Laboratory, three hours a week; pre-lab, one hour a week. Fee: $40.

Prerequisites or Corequisites: Chm 252 or permission of instructor.

CHM 272. CHEMICAL STRUCTURE DETERMINATION — **Three credits**

A study of structure determination techniques with emphasis on chromatographic methods and spectroscopy, including nuclear magnetic resonance, infrared, untraviolet, visible and mass spectroscopy. Class, one hour a week; laboratory, six hours a week. Fee: $50.

Prerequisites: Chm 222, 232, 251.

CHM 321. ADVANCED INORGANIC CHEMISTRY — **Four credits**

Introduction to ligand field theory; chemistry of the first transition series, organometallic, and *pi* acceptor compounds; mechanisms of inorganic reactions. Class, three hours a week.

Prerequisites: Chm 222 and 252.

CHM 323. ADVANCED INORGANIC CHEMISTRY LABORATORY — **One credit**

Synthesis of coordination and organometallic compounds, and spectroscopic characterization of the products using modern laboratory techniques. Must be taken concurrently with Chm 321 or with permission of instructor. Laboratory, three hours a week. Fee: $50.

Prerequisites or Corequisites: Chm 321 or permission of instructor.

CHM 342. PRINCIPLES OF INSTRUMENTAL ANALYSIS — **Two credits**

A course in the fundamental principles upon which measuring devices are based and used to build analytical instruments. With these principle, intelligent choices among competing approaches to solving an analytical problem may be made, while the limitations and pitfalls that accompany physical measurements are understood. Two one hour lecture period per week.

Prerequisite: Chm 251.

CHM 346. POLYMER CHEMISTRY — **Three credits**

Introduction to high polymers as an engineering material and the mechanical, electrical, and optical properties of polymers. Class, three hours a week. (same as MaE 332)

Prerequisite: Junior or senior standing.

CHM 361. BIOCHEMISTRY I — **Three credits**

This course is a study of the physical and chemical properties of proteins, nucleic acid, fatty acids, and carbohydrates emphasizing the relationship between the chemical structure and the biological function. The course includes the physical methods of biochemistry, enzyme kinetics, bioenergetics and nucleic acid transcription and translation.

Prerequisite: Chm 232.

CHM 362. BIOCHEMISTRY II — **Three credits**

This course is a study of the catabolism and anabolism of carbohydrates, fatty acids and amino acids. The course emphasizes the regulation and integration of major metabolic pathways, including glycolysis, the Kreb's cycle, electron transport, gluconeogenesis, pentose phosphate pathway, fatty acid metabolism and amino acid metabolism.

Prerequisite: Chm 232.

CHM 363. BIOCHEMISTRY LABORATORY — **One credit**

Laboratory experiments which emphasize biochemical techniques used in isolation and characterization of macromolecules. Included in the course are various chromatographic techniques, electrophoresis, spectrophotometry and classic biochemical methods. Laboratory three hours a week. Pre-lab, one hour per week. Fee: $50.

Prerequisite or Corequisite: Chm 361 or permission of instructor.

CHM 391. SENIOR RESEARCH I — **One credit**

The planning and execution of a chemistry research project under the direction of a faculty member. It is expected that this will be a laboratory research project. Students will also learn how to search the chemical literature using modern computer methods. Students are required to attend weekly Department seminars and present at least one seminar. Fee: $30.

Prerequisite: Senior standing in a Chemistry curriculum.

CHM 392. SENIOR RESEARCH II — **Two credits**

Students will carry out a chemistry research project under the direction of a faculty member. It is expected the project will be a laboratory research project. The project must culminate in a written report and the results must be presented at a Department seminar. Students are required to attend weekly Department seminars and present at least one seminar. Fee: $30.

CHM 395-396. INDEPENDENT RESEARCH — **One to three credits each**

Independent study and research for advanced students in the field of the major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required. Cannot be taken for credit before the seventh semester but may be a continuation of work begun before the seventh semester. Fee: one credit $30, two credits $40, three credits $50.

CHM 398. TOPICS — **One to three credits**

A study of topics of special interest, such as advanced physical chemistry, advanced analytical chemistry, advanced organic chemistry, surface and colloid chemistry, nuclear chemistry, chemical kinetics, or spectroscopy.

CHM 399. COOPERATIVE EDUCATION — **One to six credits**

Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

Students without the indicated prerequisites for 200- and 300-level chemistry courses may enroll after written permission of the instructor has been approved by the department chairperson.

CIVIL ENGINEERING

Professor Bruns, Chairperson; Professors Cox, Redmond; Associate Professors Case, S. Halsor, Klemow, Walski; Assistant Professor Steele; Adjunct Faculty Smith, Winsor; Lab Director Oram; Lab Assistant C. Halsor.

The two-year program in Civil Engineering is offered by the Department of GeoEnvironmental Sciences and Engineering. This program is specifically designed to provide a successful transfer of students to the junior year at other accredited engineering schools.

Recommended Course Sequence for Civil Engineering

First Semester		Second Semester	
Chm 115 Elements and Compounds	4	Chm 118 Chemistry for Engineers	3
Mth 111 Calculus I	4	Mth 112 Calculus II	4
SSE 107 Technological Survival	3	EE 244 FORTRAN	3
ME 180 CADD Lab	1	Phy 201 General Physics I	4
Eng 101 Composition I	3	Eng 102 Composition II	3
PE 100 Activity	0	PE 100 Activity	0
	15		17
Third Semester		**Fourth Semester**	
EE 211 Circuit Theory I	3	ME 232 Strength of Materials	3
EE 283 Electrical Measurements Lab	1	or 324 Heat and Mass Transfer	
ME 231 Statics & Dynamics	3	MAE 200 Materials Engineering	3
Mth 211 Intro. to Differential Equations	4	MAE 284 Engineering Measurements Lab	1
Phy 202 General Physics II	4	Mth 212 Multivariable Calculus	4
Distribution Requirement	3	Phy 203 General Physics III	3
		Distribution Requirement	3
	18		17

COMMUNICATIONS

Professor Kinney, Chairperson; Professor Emeritus Moran; Professor Bigler; Associate Professor Elmes-Crahall; Assistant Professor Bradbury; Visiting Assistant Professor Nolfe; Engineer, Brigido.

Total minimum number of credits required for a major in Communications leading to the B.A. degree — 120.
Total minimum number of credits required for a minor — 18.

The Department of Communications has concentrations in Rhetoric and Public Communication; Organizational Communication; Telecommunications (Radio/Television); and Journalism. Each concentration offers a wide choice of career options as well as graduate school preparation. While each concentration has its own unique curricular aspects, the goals are the same – a graduate who is able to write, speak, and think both analytically and creatively. Each concentration offers skills and performance courses and co-curricular activities that can be applied to every-day situations. In addition, the theory, writing and analysis courses should enable students to advance beyond the entry level in their chosen fields or even to change fields entirely. We believe the curriculum also affords ample opportunity for the student to explore other disciplines. It is recommended that students who major in Communications take a foreign language.

Students majoring in Communications may receive a Pennsylvania Teaching Certificate for teaching elementary school or Communications in grades 7-12. Please see the requirements listed in the Education section of this **Bulletin**.

The Major

Departmental Requirements:

All students choosing to major in Communications must fulfill specific departmental requirements. These courses contain skills, theory, analysis, performance, writing, and research. They are as follows:

COM 101 Fundamentals of Public Speaking
COM 102 Principles of Communication
COM 202 Interpersonal Communication
COM 224 Mass Media in Society
COM 324 Communication Research Methods
COM 397 Senior Seminar

The Department also has a six-hour writing requirement for all communication majors.

Concentration Requirements:

Each concentration is described and outlined on the following pages.

Organizational Communication

This concentration introduces students to the theory, skills, and application of face-to-face communication in interpersonal, small group, organizational, and public settings. Its theoretical foundation is primarily in the behavioral sciences. Communication is viewed as an ongoing process, knowledge of which permits the student to apply his or her skills to a variety of contexts.

All students concentrating in Organizational Communication will take the following three courses (9 credits):

COM 206 Business and Professional Speaking
COM 302 Fundamentals of Public Relations
COM 303 Organizational Communication

In addition, Organizational concentrators will complete 9 credits selected from the following courses:

COM 203 Small Group Communication
COM 252 Internship
(Only three credits of internship may count in the concentration.)
COM 301 Persuasion
COM 304 Intercultural Communication
COM 452 Advanced Public Relations
BA 322 Advertising
(All prerequisites must be met for BA 322)

Writing Requirement (6 credits):

COM 260 Basic Newswriting and either
COM 262 Copyediting, Headwriting and Layout *or*
Eng 202 Technical Writing

Public Relations Track:

The Public Relations Society of America has developed guidelines for undergraduates wishing to enter the field of public relations. Students should consult an advisor within the department to determine what additional courses will be necessary to meet these guidelines.

Rhetoric and Public Communication

This concentration introduces students to the history, principles, and practices of traditional rhetoric. The concentration derives it theoretical foundation from the works of classical rhetoric. It is a performance-centered concentration in which students research, write, deliver, and analyze public discourse. Each course emphasizes adaptation of messages to diverse audiences, usually found in formal, deliberative settings.

All students concentrating in Rhetoric and Public Communication are required to take the following three courses (9 credits):

COM 204 Argumentation and Debate
COM 300 Rhetorical Criticism
COM 301 Persuasion

In addition, Rhetoric concentrators will take 9 credits selected from the following courses:

COM 201 Advanced Public Speaking
COM 203 Small Group Communication
COM 205 Oral Interpretation
COM 206 Business and Professional Speaking
COM 207 Voice and Diction
COM 252 Internship
(Only three credits of internship may count in the concentration.)
COM 302 Fundamentals of Public Relations
COM 398 Topics in Presidential Campaign Rhetoric

Writing Requirement (6 credits):

Eng 201 Advanced Composition and
COM 260 Basic Newswriting *or*
COM 225 Media Criticism

Political Communication Track:

Students who are interested in careers in political communication must satisfy the twelve-credit concentration requirement, and take three political science courses at the 200 level or above. These courses should be chosen in consultation with an advisor.

Recommended Course Sequences for Organizational Communication and Rhetorical and Public Communication Concentrations

First Semester		Second Semester	
Eng 101 Composition I	3	Eng 102 Composition II	3
COM 101 Fundamentals of Speech	3	COM 102 Principles of Communication	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15		15

Third Semester		Fourth Semester	
COM 202 Interpersonal Communication	3	COM 302 Public Relations	3
Concentration Selection	3	Concentration Selection	3
Writing Requirement	3	Writing Requirement	3
Distribution Requirement	3	Distribution Requirements	6
Free Elective	3		
	15		15

Fifth Semester		Sixth Semester	
COM 224 Mass Media	3	COM 324 Research Methods	3
Concentration Selections	6	Concentration Selection	3
Distribution Requirements	6	Distribution Requirements	6
		Free Elective	3
	15		15

Seventh Semester	
Concentration Selection	3
Free Electives	12
	15

Eighth Semester	
COM 397 Senior Seminar	3
Free Electives	12
	15

Telecommunications

This concentration introduces students to the history, economics, regulations, and functions of the radio, television and cable industries. It provides students with a combination of skills, performance, and theory that will enable graduates to seek employment in those industries. In addition, students should be competitive in advertising, marketing, and research firms as well as audio/video media.

All students concentrating in Telecommunications must take the following three courses (9 credits):

COM 220 Introduction to Telecommunications
COM 221 Basic Audio Production
COM 222 Basic Video Production

In addition, Telecommunications concentrators will take 9 credits selected from the following courses:

COM 223 The Art of Film
COM 225 Media Criticism
COM 252 Internship
(Only three credits of internship may count in the concentration.)
COM 320 Media Management
COM 321 Broadcast Journalism
COM 322 Advanced Video Production
COM 362 Mass Communication Law

Writing Requirement (6 credits):

COM 260 Basic Newswriting and
Eng 201 Advanced Composition

Recommended Course Sequence for Telecommunications Concentration

First Semester	
Eng 101 Composition I	3
COM 101 Fundamentals of Speech	3
Distribution Requirements	9
PE 100 Activity	0
	15

Second Semester	
Eng 102 Composition II	3
COM 102 Principles of Communication	3
Distribution Requirements	9
PE 100 Activity	0
	15

Third Semester	
COM 202 Interpersonal Communication	3
COM 260 Basic Newswriting	3
Concentration Selection	3
Distribution Requirement	3
Free Elective	3
	15

Fourth Semester	
COM 220 Intro. to Telecommunications	3
Concentration Selection	3
Eng 201 Advanced Composition	3
Distribution Requirements	6
	15

Fifth Semester	
COM 221 Basic Audio Production	3
COM 224 Mass Media	3
Distribution Requirements	6
Free Elective	3
	15

Sixth Semester	
COM 222 Basic Video Production	3
COM 324 Research Methods	3
Distribution Requirements	6
Free Elective	3
	15

Seventh Semester	
Concentration Selection	3
Free Electives	12
	15

Eighth Semester	
COM 397 Senior Seminar	3
Free Electives	12
	15

Journalism

This concentration is designed to prepare students to write crisp, concise, lively prose for mass audiences; to utilize, interpret, and analyze primary sources; and to offer thought-provoking commentary on contemporary issues and current events. Students are strongly advised to pursue a minor in English, Political Science, History or another area, with departmental approval.

All students concentrating in Journalism will take the following three courses (9 credits):

COM 262 Copyediting, Headwriting and Layout
COM 360 Advanced Newswriting
COM 362 Mass Communication Law

In addition, Journalism concentrators will take 9 credits selected from the following courses:

COM 225 Media Criticism
COM 252 Internship
(Only three credits of internship may count in the concentration.)
COM 261 American Newspaper
COM 302 Fundamentals of Public Relations
COM 321 Broadcast Journalism
COM 361 Feature Writing

Writing Requirement (6 credits):

COM 260 Basic Newswriting and
Eng 201 Advanced Composition

Recommended Course Sequence for Journalism Concentration

First Semester

Eng 101 Composition I	3
COM 101 Fundamentals of Speech	3
Distribution Requirements	9
PE 100 Activity	0
	15

Second Semester

Eng 102 Composition II	3
COM 102 Principles of Communication	3
Distribution Requirements	9
PE 100 Activity	0
	15

Third Semester

COM 202 Interpersonal Communication	3
COM 260 Basic Newswriting	3
Concentration Selection	3
Distribution Requirement	3
Free Elective	3
	15

Fourth Semester

COM 262 Copyediting, Headwriting & Layout	3
Concentration Selection	3
Eng 201 Advanced Composition	3
Distribution Requirements	6
	15

Fifth Semester

COM 224 Mass Media	3
COM 360 Advanced Newswriting	3
Concentration Selection	3
Distribution Requirements	6
	15

Sixth Semester

COM 324 Research Methods	3
COM 362 Mass Communication Law	3
Distribution Requirements	6
Free Elective	3
	15

Seventh Semester

Concentration Selection	3
Free Electives	12
	15

Eighth Semester

COM 397 Senior Seminar	3
Free Electives	12
	15

The Minor

Minors are offered in each of the areas of concentration provided by the Department. Minor requirements are as follows:

1. **Organizational Communication Minor**

Required: Either COM 101 Fundamentals of Speech or COM 102 Principles of Communication

Electives: Five of the following:

COM 202 Interpersonal Communication
COM 203 Small Group Communication
COM 206 Business and Professional Speaking
COM 301 Persuasion
COM 302 Fundamentals of Public Relations
COM 303 Organizational Communication

2. **Rhetoric and Public Communication Minor**

Required: Either COM 101 Fundamentals of Speech or COM 102 Principles of Communication

Electives: Five of the following:

COM 201 Advanced Public Speaking
COM 203 Small Group Communication
COM 204 Argumentation and Debate
COM 206 Business and Professional Speaking
COM 300 Rhetorical Criticism
COM 301 Persuasion
COM 302 Fundamentals of Public Relations

3. **Telecommunications Minor**

Required: COM 220 Intro. to Telecommunications

Electives: Five of the following:

COM 221 Basic Audio Production
COM 222 Basic Video Production
COM 223 The Art of Film
COM 224 Mass Media in Society
COM 321 Broadcast Journalism
COM 322 Advanced Video Production
COM 362 Mass Communication Law

4. **Journalism Minor**

Required: COM 260 Basic Newswriting

Electives: Five of the following:

COM 224 Mass Media in Society
COM 261 The American Newspaper
COM 354 Publication Design
COM 360 Advanced Newswriting
COM 361 Feature Writing
COM 362 Mass Communication Law

COM 100. MODES OF EXPRESSION **Three credits**
An interdisciplinary treatment of a particular topic or issue of interest to majors and non-majors. Team taught by members of the department. Topics change.

COM 101. FUNDAMENTALS OF PUBLIC SPEAKING **Three credits**
Principles of study, application, and evaluation of public speaking. Emphasis will be upon meeting the needs of students through individualized instruction in oral communication settings. The course is taught each semester.

COM 102. PRINCIPLES OF COMMUNICATION **Three credits**
A study of the theory and process of communication. Required of all department majors. Taught every spring semester.

COM 144. DEPARTMENT PRACTICUM **One to two credits**
A – Debate and Forensics, C – WCLH Radio, D – The *Beacon*, E – Television,
F – Department.
The Department Practicum may be taken for one to two credits per semester with the total not to exceed six. Students may earn credit for major roles and positions of major responsibility in the above cocurricular activities. Credit for participation in these activities is optional, and voluntary participation (without credit) is also encouraged. The department, through the adviser or instructor of the activity, has the authority to approve or reject any contract for credit under this designation. Credits earned are applicable toward graduation but do not count toward the requirements of any concentration in COM. Written approval of credit must be by advisor and Department Chairperson.

COM 201. ADVANCED PUBLIC SPEAKING **Three credits**
Inquiry into the practice and principles of speech composition and presentation. Detailed analysis of the areas of invention, arrangement, style, and delivery, and an introduction to speech criticism.
Prerequisite: COM 101 or consent of instructor.

COM 202. INTERPERSONAL COMMUNICATION **Three credits**
The course focuses on interpersonal communication theory and its application to improving the student's interpersonal skills in managing conflict, negotiating, interviewing, and in developing relationships.

COM 203. SMALL GROUP COMMUNICATION **Three credits**
The course is designed to expand the student's knowledge of the theories and types of small group communication. Emphasis on the task, leadership, and interpersonal skills of participants. Course taught spring semester, every year.
Prerequisite: COM 102.

COM 204. ARGUMENTATION AND DEBATE **Three credits**
Training in the fundamentals of argumentation and debate, with practice in gathering and organizing evidence and support materials. Course taught every other fall semester.
Prerequisite: COM 101 or consent of instructor.

COM 205. ORAL INTERPRETATION **Three credits**
An investigation of literature that combines analysis with interpretive oral performance.

COM 206. BUSINESS AND PROFESSIONAL SPEAKING **Three credits**
Course will concentrate on communication theory as applied to business and professional settings. Students will make several oral presentations and participate in interviewing and conferences. Course taught fall semester, every year.

COM 207. VOICE AND DICTION **Three credits**
A study of voice production and articulation, analysis of regional speech differences and standards.
Prerequisite: COM 101.

COM 220. INTRODUCTION TO TELECOMMUNICATIONS **Three credits**
Study of the radio, television, and cable industries. Emphasis on their development as public and commercial institutions. Consideration of economic and regulatory issues affecting programming.
Prerequisite: COM 224.

COM 221. AUDIO PRODUCTION **Three credits**
A study of the principles and techniques of audio production. A special emphasis is placed on radio-related issues, skills, and projects. Consideration of the sound media as tools of artistic expression. Lecture and laboratory.
Prerequisite: COM 220. Taught every fall semester.

COM 222. BASIC VIDEO PRODUCTION **Three credits**
A study of the principles and techniques of TV Studio Production. A special emphasis is placed on the utilization of these techniques in a broadcast setting. Included will be: Camerawork, Switching, Studio Equipment, Set Design, Directing and Producing. Fee: $25.

COM 223. THE ART OF FILM **Three credits**
An introduction to the esthetics, techniques, and critical analysis of cinematic art through the study of representative films of current and past film directors. Screenings and writing intensified.

COM 224. MASS MEDIA IN SOCIETY **Three credits**
A study of the mass media and their role in contemporary society.

COM 225. MEDIA CRITICISM **Three credits**
Students analyze and evaluate all forms of mass media content — visual and verbal. Written analysis of primary texts: plays, scripts, essays, short stories, newspaper, and magazine articles, as well as radio and television programming, speeches, and films. Critical principles will be applied.

COM 252. INTERNSHIP **Three to six credits**
A supervised program of work and study in any of the concentrations. Written permission of the department is required.

COM 260. BASIC NEWSWRITING **Three credits**
Fundamentals of newsgathering, newswriting, and news judgment for all media; study of news sources; fieldwork, research, and interview techniques. Designated writing intensive. Fee: $25.
Prerequisite: Eng 101-102.

COM 261. THE AMERICAN NEWSPAPER **Three credits**
A survey of contemporary newspapers emphasizing the analysis of their editorial content. Includes an examination of alternative newspapers.
Prerequisite: COM 260.

COM 262. COPYEDITING, HEADWRITING AND LAYOUT **Three credits**
The focus of the course is evaluating news, assignment position in newspapers, editing and rewriting news to conform to publications style. Students will become familiar with typography and the use of type in the design of newspapers, news letters or in-house publications. The course provides hands-on instruction in achieving typographical balance and attractive display

through type variation. Assessment of story composition for clarity and continuity, as well as freedom from basic writing errors will be explored. Extensive practice in editing copy with the use of universal copy editing symbols. Course involves both lecture and hands-on, laboratory experience.

Prerequisite: COM 260 or permission of instructor.

COM 300. RHETORICAL CRITICISM **Three credits**

Theories from classical to contemporary will be applied to the analysis of the spoken word. Emphasis on speech writing and criticism.

Prerequisite: COM 101.

COM 301. PERSUASION **Three credits**

Study and practice of persuasive speaking. General theories of persuasion, the role of persuasion in a democratic society, and an introduction to modern experimental research in the field.

Prerequisite: COM 101.

COM 302. FUNDAMENTALS OF PUBLIC RELATIONS **Three credits**

An introduction to the fundamentals of public relations practice, including program planning and evaluation, working with the media, writing for PR, and coordinating special events and functions.

Prerequisite: COM 260. Spring semesters.

COM 303. ORGANIZATIONAL COMMUNICATION **Three credits**

Course focuses attention on traditional and modern concepts of communication channels in simple and complex organizations. Considerable attention is given to interviewing and conducting communication audits.

Prerequisite: COM 102 or permission of instructor.

COM 304. INTERCULTURAL COMMUNICATION **Three credits**

Intercultural Communication is a systematic study of what happens when people from different cultural backgrounds interact face-to-face. The course is a balance between theoretical and practical knowledge, with emphasis on immediately usable knowledge. Guest speakers, in-class simulations, cross-cultural interviews, and research projects ask students to apply communication skills to actual intercultural situations.

Prerequisite: COM 102 or permission of instructor.

COM 320. MEDIA MANAGEMENT **Three credits**

This course will provide a framework for understanding the functions and methods of media managers in both print and non-print media.

Prerequisites: COM 220, COM 224 or permission of instructor.

Offered spring semesters in alternate years.

COM 321. BROADCAST JOURNALISM **Three credits**

A study of the principles and methods of broadcast journalism.

COM 322. ADVANCED VIDEO PRODUCTION **Three credits**

A study of the principles and techniques of video production. Scripting, producing, and editing videography are subjects covered extensively by this course. Each student will produce several video productions.

Course taught every spring semester.

COM 324. COMMUNICATION RESEARCH METHODS **Three credits**

Study of research methods in various areas of communication. Emphasis on ability to research literature and critique a research design. Consideration of content analysis and empirical design. Required of all majors.

Prerequisite: COM 102 and completion of departmental writing requirement. Course taught every fall semester.

COM 354. PUBLICATION DESIGN **Three credits**

Familiarization with the tools, design elements, and production processes of the graphic artist. The value and contribution of the graphic arts to society will be discussed. Students will experience methods and techniques currently being practiced in the graphic design field. It is suggested that students without an art background take Art 103 prior to this course. (Same as Art 131)

COM 360. ADVANCED NEWSWRITING **Three credits**

A study of specialized reporting and an introduction to news editing. Designated writing intensive.

Prerequisite: COM 260.

COM 361. FEATURE WRITING **Three credits**

A study of feature articles for newspapers, syndicates, magazines, and specialized publications. Practice in research, interviewing, and writing. Designated writing intensive.

Prerequisite: COM 260.

COM 362. MASS COMMUNICATION LAW **Three credits**

Current legal problems, theory of controls in journalism, television, and radio; libel, copyright, privacy law, and other legal issues affecting the mass media. A case study approach will be used.

Prerequisite: COM 102.

COM 395-396. INDEPENDENT RESEARCH **One to three credits**

Independent study and research for advanced students in the speech and communication programs under the direction of a staff member. A research paper at a level significantly beyond a term paper is required. Written permission of department is required.

COM 397. SENIOR SEMINAR/COMMUNICATIONS **Three credits**

An in-depth investigation of current research and ethical issues in communication. A research paper and senior project required. Required of all majors.

Prerequisite: COM 324 and junior/senior standing. Course taught every spring semester.

COM 398. TOPICS **One to three credits**

A study of topics of special interest not extensively treated in regularly offered courses.

COM 452. ADVANCED PUBLIC RELATIONS **Three credits**

COM 452 is an advanced course in public relations, taught in seminar format. Emphasis is placed on planning, researching, budgeting, carrying out and evaluating actual public relations campaigns. The course is both writing and speaking intensive. In cooperation with various community-based businesses and non-profit clients, student "teams" conduct actual, semester-long promotional campaigns. Students should be competent in basic newswriting, interviewing and fundamentals of public relations.

Prerequisite: COM 302.

COM 399. COOPERATIVE EDUCATION **One to six credits**

Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.25 cumulative average, consent of academic advisor, approval of placement by department chairperson.

COMPUTER INFORMATION SYSTEMS

Associate Professor Berard, Chairperson. Professors Emeriti Earl, Richards, Salsburg; Professors Koch, Merrill, Sours, Tillman, Wong; Associate Professor DeCosmo; Assistant Professors Gabbert, Kugendran, Lew, Sullivan, Turney.

Total minimum number of credits required for a major in Computer Information Systems leading to the B.S. degree — 122.

Total minimum number of credits required for a minor in Management Information Systems — 21.

An interdisciplinary program leading to the B.S. degree with a major in Computer Information Systems is offered by the Department of Mathematics and Computer Science, in cooperation with the Department of Business and Economics. Also available is a minor in Management Information Systems. (Students majoring in Computer Information Systems are **not** permitted to obtain a minor in Management Information Systems.)

Major in Computer Information Systems

The CIS program is concerned mainly with the use of computer systems in business and industrial organizations. Its principal subject matter includes the study of systems analysis, systems design and computer programming, along with other analytical and business areas which are pertinent to the development, implementation, and maintenance of information systems. Required courses for a Computer Information Systems major are indicated in the curriculum outline recommended below.

Minor in Management Information Systems

Required courses:	**credit hours**
CS 124, 224, 324, 325	12
BA 351	3
Any two among: BA 352, 354, 356	6
Minimum Total Required	21

Recommended Course Sequence for a Major in Computer Information Systems

NOTE: All distribution requirements should be chosen to satisfy the General Education Requirements listed on pages 48-50. While all of the courses listed are required, sequencing may vary, provided that the prerequisites are met.

First Semester		**Second Semester**	
Eng 101 Composition I	3	Eng 102 Composition II	3
CS 115 Computers and Applications	3	CS 224 File Management: COBOL	3
CS 124 Introduction to Business Programming: COBOL	3	Mth 106 Calculus for Life, Managerial, and Social Sciences II	4
Mth 105 Calculus for Life, Managerial, and Social Sciences I	4	Distribution Requirements	6
Distribution Requirement	3	PE 100 Activity	0
PE 100 Activity	0		16
	16		

Third Semester		**Fourth Semester**	
CS 226 C and UNIX	3	BA 352 Production and Operations Management	3
BA 351 Management of Organizations	3	Acc 122 Intro. Managerial Accounting	3
Acc 121 Intro. Financial Accounting	3	Mth 150 Elementary Statistics	3
Distribution Requirements	6	Distribution Requirements	6
	15		15

Fifth Semester		**Sixth Semester**	
CS 324 Systems Analysis	3	CS 325 Database Management	3
BA 341 Managerial Finance	3	BA 321 Marketing	3
Science Elective[1]	3	Science Elective[1]	3
Distribution Requirement	3	Distribution Requirement	3
Free Elective	3	Free Elective	3
	15		15

Seventh Semester		**Eighth Semester**	
CS/Mth Elective[2]	3	CS/Mth Elective[2]	3
COM 101 Public Speaking	3	BA 354 Organizational Behavior or	3
Eng 202 Technical and Professional Writing	3	BA 356 The Social Responsibility of Business	
Free Electives	6	Free Electives	9
	15		15

[1] See page 130 for the Department's requirements regarding Science electives.
[2] See page 130 for the Department's requirements regarding CS/Mth electives.

Summary of Minimum Credit Distribution for the CIS Major:

	credit hours
CS 115, 124, 224, 226, 324, and 325	18
CS/Mth Electives	6
Acc 121-122, BA 321, 341, 351, and 352	18
BA 354 or BA 356	3
Mth 105-106, and 150	11
Eng 101-102	6
Eng 202	3
COM 101	3
Science Electives	6
Distribution Requirements	27
Free Electives	21
Total	122

Science Electives for Computer Information Systems Majors:

Two courses in Biology, Chemistry, GeoEnvironmental Sciences or Physics.

CS/Mth Electives for Computer Information Systems Majors:

CS/Mth electives must include one course from the Computer Applications and Programming area and one additional course from either area listed below.

Decision Support Systems: CS 321, 360, 363; Mth 354

Computer Applications and Programming: CS 335, 340, 350, 355, 367



COMPUTER SCIENCE

Associate Professor Berard, Chairperson; Professors Emeriti Earl, Richards, Salsburg; Professors Koch, Merrill, Sours, Tillman, Wong; Associate Professor DeCosmo; Assistant Professors Gabbert, Kugendran, Lew, Sullivan, Turney.

Total minimum number of credits required for a major in Computer Science leading to the B.A. degree — 123.

Total minimum number of credits required for a major in Computer Science leading to the B.S. degree — 125.

Total minimum number of credits required for a minor — 21.

A broad program of study leading to a B.A. or B.S. degree with a major or minor in computer science is offered by the Department of Mathematics and Computer Science. The Department also offers major programs in mathematics and Computer Information Systems (see page 128), and minor programs in management information systems (see page 128) and statistics (see page 238).

Major in Computer Science

The Computer Science curriculum consists of theoretical as well as application-oriented courses and is based on a strong foundation in mathematics. The B.A. degree is intended for those interested in management and social sciences, whereas the B.S. degree requires greater concentration in the engineering, natural and physical sciences. With appropriate choices of major electives, students can prepare for graduate study and research in the discipline, or for employment in government or industry. Students are encouraged, through the attainment of a minor or second major, to acquire competence in an area that lends itself to meaningful computer applications. Required courses for a computer science major are indicated in the curriculum outlines recommended on page 132.

With the approval of the department, a student may earn credits in a maximum of five mathematics or computer science courses by passing special challenge examinations. Interested students may obtain further details and application forms from the department chairperson.

Minor in Computer Science

Required Courses:	**credit hours**
CS 123 or 124 or 226, 125, 126, 227	12
Electives: chosen in accordance with either (a) or (b) below:	9
a. CS minor with emphasis on data processing applications — CS 224, 324, 325	
b. general CS minor — CS 230 and any two CS courses numbered above 250	
Minimum Total Required	21

Recommended Course Sequences for a Major in Computer Science

NOTE: All distribution requirements should be chosen to satisfy the General Education Requirements listed on pages 48-50, except that science electives must be in accordance with the Department's requirements specified on page 133. While all of the courses listed below are required, the sequencing may vary, provided that the prerequisites are met.

First Semester

	B.A.	B.S.
Mth 111 Calculus I	4	4
Eng 101 Composition I	3	3
CS 125 Computer Science I	3	3
Distribution Requirements	6	6
PE 100 Activity	0	0
	16	16

Second Semester

	B.A.	B.S.
Mth 112 Calculus II	4	4
Eng 102 Composition II	3	3
CS 126 Computer Science II	3	3
Distribution Requirements	6	6
PE 100 Activity	0	0
	16	16

Third Semester

	B.A.	B.S.
Mth 202 Set Theory and Logic	4	4
CS 226 C and UNIX	3	3
CS 230 Machine Language	3	3
Distribution Requirements	6	6
	16	16

Fourth Semester

	B.A.	B.S.
Mth 214 Linear Algebra	3	3
CS 227 Computer Data Structures	3	3
Science Elective[1]	—	3
Distribution Requirements	9	6
	15	15

Fifth Semester

	B.A.	B.S.
CS Electives[2]	3	6
Science Elective[1]	3	4
Distribution Requirement	—	3
Free Electives	9	3
	15	16

Sixth Semester

	B.A.	B.S.
CS Elective[2]	3	3
Science Elective[1]	3	4
Free Electives	9	9
	15	16

Seventh Semester

	B.A.	B.S.
CS Elective[2]	3	3
Free Electives	12	12
	15	15

Eighth Semester

	B.A.	B.S.
CS Elective[2]	3	3
Free Electives	12	12
	15	15

1 See page 133 for the Department's requirements regarding science electives.
2 See page 133 for the Department's requirements regarding CS electives.

Science Electives for Computer Science Majors:

B.A. candidates: Two courses in Biology, Chemistry, GeoEnvironmental Sciences or Physics.

B.S. candidates: Any two courses in Biology, Chemistry, Earth and Environmental Sciences, or Physics, which are normally taken by majors in these fields.

and

One additional course in Biology, Chemistry, Earth and Environmental Sciences, Physics, EE 341 or EE 342 or any Engineering course not cross-listed in Computer Science.
All three courses must be numbered above 200 except that Bio 121, 122, Chm 115, 116, or 118 are also acceptable in this requirement.

Computer Science Electives for Computer Science Majors:

B.A. candidates: Four courses, including two from the Applications area and one each from two of the Theory, Systems, or Languages areas.

B.S. candidates: Five courses, including one from each area listed below and one from Theory, Systems, or Languages.

Applications	Theory	Systems	Languages
CS 321	CS 323	CS 326	CS 319
CS 324	CS 328	CS 330	CS 327
CS 325		CS 355	CS 350
CS 335			
CS 340			
CS 364			
CS 367			

Summary of Minimum Credit Distribution for Computer Science Majors:

	B.A.	B.S.
Mth 111, 112, 202, and 214	15	15
CS 125, 126, 226, 227, and 230	15	15
CS Electives	12	15
Science Electives	6	11
Eng 101-102	6	6
Distribution Requirements	27	27
Free Electives	42	36
Minimum Total Required	123	125

CS 115. COMPUTERS AND APPLICATIONS **Three credits**

Introduction to computers, both large and small, but with emphasis on, and hands-on experience with, personal computers (Macintosh, IBM-PC). Includes a survey of current commercial software (including word processing, a database, and a spread sheet). Not open to students who have prior credit in any 200-level CS course. Computer science majors will not receive credit in their major for CS 115. Fee: $50.

Offered every fall, spring and summer.

CS 123. INTRODUCTION TO SCIENTIFIC PROGRAMMING: FORTRAN **Three credits**

Structured programming, algorithm design, and introduction to programming using FORTRAN 77. The computer is used to solve problems from a variety of fields. Fee: $50. (same as EE 244)

Prerequisite: Secondary mathematics including geometry and algebra II.

Offered every fall, spring and summer.

CS 124. INTRODUCTION TO BUSINESS PROGRAMMING: COBOL **Three credits**

Introduction to computer programming using the American National Standard Common Business Oriented Language. The computer is used to solve problems commonly found in a business environment. Fee: $50.

Offered every fall, spring, and summer.

CS 125. COMPUTER SCIENCE I **Three credits**

An introduction to the fundamental concepts of computer science, with emphasis on problem solving and algorithm design using the Pascal programming language. Fee: $50. (same as EE 245)

Prerequisite: Secondary mathematics including geometry and algebra II.

Offered every fall.

CS 126. COMPUTER SCIENCE II **Three credits**

A study of advanced programming techniques (including recursion and manipulation of structured data types and pointer variables) and abstract linear data structures (lists, stacks, and queues). Fee: $50. (same as EE 246)

Prerequisite: CS 125 (EE 245).

Offered every spring.

CS 224. FILE MANAGEMENT: COBOL **Three credits**

A study of advanced programming techniques using ANS COBOL. Topics include efficiency techniques, modular programming, table searching, indexed, direct, and relative file techniques. Fee: $50.

Prerequisite: CS 124.

Offered every spring and summer.

CS 226. C AND UNIX **Three credits**

Topics include concepts of time-sharing operating systems, basic UNIX features such as file structures, the shell, the EMACS editor, the electronic mail system, and the File Transfer Protocol (ftp); basic C constructs such as loops, arrays, functions, recursive calls, parameter-passing methods, and pointers; advanced C constructs such as structures, unions, and user defined data types; I/O statements and system calls. (same as EE 248)

Prerequisite: CS 126 or CS 224 or permission of instructor.

Offered every fall.

CS 227. COMPUTER DATA STRUCTURES **Three credits**

A study of the use of a high-level language to implement complex data structures and their application to sorting and searching. These structures include lists, trees, graphs, networks and storage allocation. Fee: $50. (same as EE 343)

Prerequisite: CS 126/EE 246.

Offered every spring.

CS 230. MACHINE LANGUAGE **Three credits**

Basic principles of assembly language programming. Computer organization and representation of numbers, strings, arrays, list structures at the machine level. Examples utilize all levels of computer architecture. Fee: $50. (same as EE 242)

Prerequisite: CS 126/EE 246.

Offered every fall.

CS 319. PRINCIPLES OF PROGRAMMING LANGUAGES **Three credits**

A study of the principles that govern the design and implementation of programming languages. Topics include language structure, data types, and control structures. Programming projects will familiarize students with the features of several specific languages, such as Ada, LISP, and PROLOG.

Prerequisite: CS 227.

Offered in the spring semester of even years.

CS 320. DIGITAL DESIGN **Three credits**

Boolean Algebra; Application Specific Integrated Circuit (ASIC) digital logic functions, such as AND, OR, INVERT; digital storage devices; combinational logic; minimization techniques; synchronous and asynchronous design; delay analysis; state machines; ASIC's. Two hours lecture a week and one two-hour of lab a week. Fee: $50. (same as EE 341)

Prerequisite: Junior standing.

Offered every fall.

CS 321. SIMULATION AND DATA ANALYSIS **Three credits**

Methods of handling large data bases including statistical analysis and computer simulations. The emphasis will be upon discrete simulation models with a discussion of relevant computer languages, SLAM, GPSS, and/or SIMSCRIPT.

Prerequisites: CS 123/EE 244 or CS 125/EE 245 and one year of calculus.

Offered in the fall semester of odd years.

CS 323. THEORY OF COMPUTATION **Three credits**

This course formalizes many topics encountered in previous computing courses. Topics include languages, grammars, finite automata, regular expressions and grammars, context-free languages, push-down automata, Turing machines and computability.

Prerequisites: Mth 202 and CS 126/EE 246.

Offered in the fall semester of even years.

CS 324. SYSTEMS ANALYSIS **Three credits**

A study of the design and implementation of large computer projects. Special emphasis is placed on applications to business systems. Students will use a CASE tool for automated systems analysis and design.

Prerequisite: CS 224.

Offered every fall.

CS 325. DATABASE MANAGEMENT **Three credits**

Practical experience in solving a large-scale computer problem including determination of data requirements, appropriate data organization, data manipulation procedures, implementation, testing and documentation.

Prerequisite: CS 324.

Offered every spring.

CS 326. OPERATING SYSTEM PRINCIPLES **Three credits**

Analysis of the computer operating systems including Batch, Timesharing, and Realtime systems. Topics include sequential and concurrent processes, processor and storage management, resource protection, processor multiplexing, and handling of interrupts from peripheral devices. (same as EE 344)

Prerequisite: CS 227/EE 343.

Offered in the fall semester of odd years.

CS 327. COMPILER DESIGN **Three credits**

A study of compiler design including language definition, syntactic analysis, lexical analysis, storage allocation, error detection and recovery, code generation and optimization problems.

Prerequisite: CS 227/EE 343.

Offered in the spring semester of odd years.

CS 328. ALGORITHMS **Three credits**

Theoretical analysis of various algorithms. Topics are chosen from sorting, searching, selection, matrix multiplication and multiplication of real numbers, and various combinatorial algorithms.

Prerequisites: CS 227/EE 343 and Mth 202.

Offered in the fall semester of odd years.

CS 329. MICROCOMPUTER OPERATION AND DESIGN **Three credits**

Microprocessor architecture, microcomputer design, and peripheral interfacing. Microprogramming, software systems, and representative applications. Associated laboratory experiments consider topics such as bus structure, programming, data conversion, interfacing, data acquisition, and computer control. Two hours lecture and one two-hour laboratory per week. Fee: $50. (see EE 342)

Prerequisite: CS 320/EE 341.

Offered every spring.

CS 330. COMPUTER ARCHITECTURE **Three credits**

A study of the design, organization, and structure of computers, ranging from the microprocessors to the latest "supercomputers." (same as EE 346)

Prerequisite: CS 230/EE 242 or CS 329/EE 342.

Offered in the spring semester of odd years.

CS 335. ADVANCED DATABASE CONCEPTS **Three credits**

A continuation of CS 325. Concentration on the design of a large scale database system, current special hardware and software, and the role of a DBMS in an organization.

Prerequisite: CS 325.

Offered in the fall semester of even years.

CS 340. ARTIFICIAL INTELLIGENCE **Three credits**

This course will provide an overview of artificial intelligence (AI) application areas and hands-on experience with some common AI computational tools. Topics include search, natural language processing, theorem proving, planning, machine learning, robotics, vision, knowledge-based systems (expert systems), and neural networks. (same as EE 317)

Prerequisite: CS 126 or CS 224 or permission of instructor.

Offered in the spring semester of even years.

CS 350. OBJECT-ORIENTED PROGRAMMING **Three credits**

The course serves as a practical introduction to the object-oriented programming paradigm. Fundamental concepts of object-oriented programming will be covered; these include objects, classes, inheritance, polymorphism, and data abstraction. Attention will be focused on program development; among the specific languages to be covered are Smalltalk and C++. Object-oriented databases will also be discussed.

Prerequisite: CS 126 or CS 224 or permission of instructor.

Offered in the fall semester of even years.

CS 355. COMPUTER NETWORKS **Three credits**

This course introduces basic concepts, architecture, and widely used protocols of computer networks. Topics include the Open System Interconnection (OSI) model consisting of physical link layer, data layer, network layer, transport layer, session layer, presentation layer, and application layer; medium access sublayer and LAN; various routing protocols; Transmission Control Protocol (TCP) and Internet Protocol (IP) for internetworking. (same as EE 347)

Prerequisite: CS 126 or CS 224 or permission of instructor.

Offered in the spring semester of even years.

CS 360. LINEAR PROGRAMMING **Three credits**

Graphical linear programming, simplex algorithm and sensitivity analysis. Special L.P. models such as the transportation problem, transshipment problem, and assignment problem. May include integer programming, branch and bound algorithm, geometric programming, goal programming. (same as Mth 360)

Prerequisites: Mth 106 and CS 123 or CS 125.

Offered in the fall semester of odd years.

CS 363. OPERATIONS RESEARCH **Three credits**

A survey of operations research topics such as decision analysis, inventory models, queueing models, dynamic programming, network models, heuristic models, and non-linear programming. (same as Mth 363)

Prerequisites: CS 123 or CS 125; Mth 105-106 or Mth 111-112; and some elementary knowledge of matrices.

Offered every spring.

CS 364. NUMERICAL ANALYSIS **Three credits**

Numerical methods of differentiation, integration, solution of equations and of differential equations with emphasis on problems that lend themselves to solution using computers. (same as Mth 464)

Prerequisites: CS 123/EE 244 or CS 125/EE 245 and Mth 211 or consent of instructor.

Offered in the spring semester of odd years.

CS 367. COMPUTER GRAPHICS **Three credits**

Introduction to equipment and techniques used to generate graphical representations by computer. Discussion of the mathematical techniques necessary to draw objects in two- and three-dimensional space. Emphasis on application programming and the use of a high-resolution color raster display.

Prerequisite: CS 227/EE 343.

Offered in the fall semester of even years.

CS 370. SPECIAL PROJECTS **Variable credit**

The definition, formulation, programming, solution, documentation, and testing of a sophisticated problem or project under close faculty supervision. The project will be drawn from industry, business, or governmental agency in the greater Wilkes-Barre area. The student will be expected to present a written report at the conclusion of the project. This course may be taken as part of the Cooperative Education Program. A student may apply at most six credits of CS 370 and a maximum of twelve credits in CS 370 and Cooperative Education 399 toward the graduation requirement in the computer science major.

Prerequisite: Senior standing and approval of department chairperson.

CS 395-396. INDEPENDENT STUDY IN COMPUTER SCIENCE **Variable credit**
Individual study in a chosen area of computer science under the supervision of a faculty member. May be repeated for credit.

Prerequisite: Approval of department chairperson.

CS 399. COOPERATIVE EDUCATION **One to six credits**
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

CS 198/298/398/498. TOPICS IN COMPUTER SCIENCE **Variable credit**
Study of one or more special topics in computer science. May be repeated for credit, if involving different topics.

Prerequisite: Varies with topics studied.

DANCE

Associate Professor Reiprich, Acting Chairperson; Adjunct Faculty P. Degnan, K. Degnan.

Total minimum number of credits required for a minor — 18.

As a dimension of its continuing development in the performing arts, Wilkes University has inaugurated a comprehensive program in the field of dance. The program is structured in such a manner as to allow for the evolution of a major program in the academic discipline of dance.

The total minimum number of credits for a minor in Dance is 18 (above DAN 100). An advanced project in dance composition is also required of all students enrolled in the Dance minor; this project will be under the supervision of the minor advisor.

DAN 100. DANCE APPRECIATION: COMPREHENSIVE DANCE FORMS **Three credits**
A general introduction to the various types of dance: (classical ballet, modern, jazz, and theatrical). This course is appropriate for the person who has had absolutely no participatory experience in this art form. It is designed to cultivate especially an appreciation of the aesthetic dimensions of dance, perceived for the first time as an opportunity for personal physical engagement.

DAN 110. INTRODUCTION TO MODERN DANCE **Two credits**
An introduction to the fundamentals of modern dance, concentrating on the Graham method.

DAN 120. TAP DANCE **Two credits**
An introduction to the fundamentals of tap dancing, with special reference to the techniques of great American artists.

DAN 130. INTRODUCTION TO JAZZ DANCE **Two credits**
An introduction to the fundamentals of jazz techniques as systematized by the Luigi method.

DAN 150. CLASSICAL DANCE FOR THE STAGE **Two credits**
An introductory course entailing lecture/demonstration and studio exercises designed to explore the movement dynamics appropriate to dramatic presentation. Special emphasis is given to the development of sound classical ballet technique (per a modified Vaganova methodology) as the foundation for the cultivation of poise, stage presence, kinetic flexibility, and physical stamina — valuable qualities for the acting profession. Particular attention is given to pantomime and non-dance movement such as fencing and hand-to-hand combat in a stage-space setting.

DAN 153. POINTE I **Two credits**
Basic techniques of ballet on pointe; introduction to variations from the classical repertory. Building on the foundation laid in DAN 151, this course is designed to help the female dancer make the transition from demi-pointe to pointe dancing.

DAN 157. PAS DE DEUX I **Two credits**
The basic techniques required for male and female dancers to perform as a unit. This course is intended to provide a gradual and individually-paced introduction into the techniques as well as the psychology of classical ballet partnering.

Prerequisite: Audition.

DAN 210. MODERN DANCE I **Two credits**
This course builds on the foundation provided the student in DAN 110, elaborating further on the fundamentals of modern dance according to the Graham method. It is designed to provide an experientially structured and professionally informed exploration of the art of modern dance. Its objective is the acquisition, at each individual student's pace, of the qualities of grace, physical stamina, muscular and ligament flexibility, and movement musicality.

Prerequisite: DAN 110 or permission of instructor.

DAN 211. MODERN DANCE II **Two credits**
This course is the sequel to DAN 210, providing the truly committed student with the opportunity, at an intermediate level, for an even more substantive and diversified participatory engagement in modern dance. It engages the student/dancer in highly individualized movements based on personalized, multi-faceted and changing artistic standards.

Prerequisite: DAN 210 or permission of instructor.

DAN 230. JAZZ DANCE I **Two credits**
The first course involving an intensive and progressively challenging engagement in the Jazz techniques per the Luigi method.

DAN 231. JAZZ DANCE II **Two credits**
This is the second in the progressively demanding courses in the four-semester elective sequence in which students are intensively engaged in learning and executing jazz techniques per the Luigi method. Through the study of jazz dance techniques as systematized by the Luigi method, students are encouraged to perceive the nature of dance movement and to acquire some proficiency in its application to stage performance or at least to achieve a greater awareness of body structure and function.

Prerequisite: DAN 230 or permission of instructor.

DAN 250. CLASSICAL BALLET I **Two credits**
The first course in the study of the theory and techniques of Russian classical ballet, as pursued in the curricula of the schools of the Bolshoi and Kirov Ballets and derived from the methodology devised by Agrippina Vaganova and Cecchetti.

DAN 251. CLASSICAL BALLET II **Two credits**

This course is designed to build on the foundation acquired in DAN 250 for an intensive intellectual, emotional, and physical engagement in the study of the theory and techniques of Russian classical ballet, as pursued in the curricula of the schools of the Bolshoi and Kirov Ballets and derived from the methodology devised by Agrippina Vaganova and Cecchetti.

Prerequisite: DAN 250 or permission of instructor.

DAN 261. DANCE IMPROVISATION I **Two credits**

Designed to develop creativity in dance by exercising the student in movement in free forms while training the body as a disciplined instrument. Exploration of the broad range of dance movement in a choreographical context is intended to introduce the student into the elementary aspects of dance perception and design.

DAN 310. MODERN DANCE III **Two credits**

This is an advanced course in modern dance, affording the student the opportunity to engage, experientially, in some of the more technically and choreographically demanding and innovative aspects of modern dance. In the exploration of these movement elaborations, the aesthetic vision of the choreographers may be perceived, especially in terms of how they adapted much of the disciplined technique of classical ballet in an exciting syncretic fusion.

Prerequisite: DAN 211 or permission of instructor.

DAN 330. JAZZ DANCE III **Two credits**

This is the third in the progressively demanding courses in the four-semester elective sequence in which students are intensively engaged in learning and executing jazz techniques per the Luigi method. Emphasizing a blending of theory and practice, this course is intended to encourage students to explore another dimension of personal fulfillment while cultivating realistically their potential as physically coordinated, aesthetically sensitive, poised and graceful persons.

Prerequisite: DAN 231 or permission of instructor.

DAN 331. JAZZ DANCE IV **Two credits**

This is the fourth in the progressively demanding courses in the four-semester elective sequence in which students are intensively engaged in learning and executing jazz techniques per the Luigi method.

Prerequisite: DAN 330 or permission of instructor.

DAN 350. CLASSICAL BALLET III **Two credits**

This course is designed to build on the foundation laid in DAN 250-251. Course presentation will employ lecture/demonstration and studio exercises designed to explore the movement dynamics which are especially appropriate to the classical dance genre. The objective of this course is the continued individually paced development of the qualities of grace, physical stamina, muscular and ligament flexibility, and movement musicality, especially via direct and active engagement in classical dance technique.

Prerequisite: DAN 251 or permission of instructor.

DAN 351. CLASSICAL BALLET IV **Two credits**

This course is designed to continue to build on the foundation laid in DAN 250-251, 350. Special emphasis will be given in this course to the development of sound classical ballet technique (per a modified Vaganova methodology) as the foundation for the cultivation of poise, stage presence, kinetic flexibility, and physical stamina.

Prerequisite: DAN 350 or permission of instructor.

DAN 198/298. TOPICS **Three credits**

A study of topics of special interest not extensively treated in regularly offered courses.

EARTH AND ENVIRONMENTAL SCIENCES

Professor Bruns, Chairperson; Professors Cox, Redmond; Associate Professors Case, Halsor, Klemow, Walski; Assistant Professor Steele; Visiting Assistant Professor Tarutis; Adjunct Faculty Smith, Winsor; Lab Director Oram; Lab Assistant C. Halsor.

Total minimum number of credits required for a major in Earth and Environmental Science leading to the B.A. — 126.

Total minimum number of credits required for a major in Earth and Environmental Science leading to the B.S. — 128.

Total minimum number of credits required for a minor — 18.

Total minimum number of credits required for a minor in Geology — 18.

The GeoEnvironmental Sciences and Engineering Department offers two major programs, both of which incorporate a strong background in all of the sciences and include extensive laboratory and field experience. The department highlights two unique facilities: a certified water quality laboratory used for teaching and contract work, and a 150 acre environmental station (Ratchford Field Station) with various aquatic and terrestrial habitats available for field study in courses and student research. The interdisciplinary nature of the programs provides the student with a unique breadth of understanding of the principles and concepts of the earth and environmental sciences while emphasizing methods of analysis and experimentation of very complex, dynamic, and interactive quality; cooperative internships with environmental organizations and industries are encouraged.

The major leading to the B.S. degree emphasizes the technical and analytical aspects of the earth and environmental sciences and is designed for those students intending to work as scientists in laboratory, field, or research positions. Students with this degree may enter graduate programs in Geology, Meteorology, and Environmental Sciences.

The major leading to the B.A. degree emphasizes human interactions with the earth and environmental sciences and as such, while still requiring an extensive background in the sciences, includes additional coursework in the social sciences and political science. The student is required to choose an appropriate minor so as to acquire an expertise in areas such as technical writing, business administration, elementary education or political science. Students with this degree would be trained to work in environmental science policy-making and administration. Another option is to satisfy the requirements leading to a Pennsylvania Secondary Teaching Certificate with certification in Earth and Space Science.

Two minors are offered by the department. A minor can be obtained by students with a demonstrated expertise in earth and environmental sciences or geology as determined by the faculty of the department. The minimum requirement for the Earth and Environmental Sciences minor can be met by

students who have completed 18 credits in GES (at least 12 credits at the 200-level or above). For the Geology minor, 18 credits of GES geology courses are required (at least 15 credits at the 200-level or above). Only those course credits for which a student has achieved a grade of 2.0 or higher will count toward the minimum requirements for either minor. Courses counted toward the Geology minor could not be used for the existing EES minor; however, since there is no geology major, EES majors, like any other major, could pursue a Geology minor. Also, EES majors may take any of the Environmental Engineering courses (ENV), if prerequisites are satisfied.

Courses which qualify for the Geology Minor

Course		credits	Course		credits
GES 115	Survey of Geology	3	GES 381	Mineralogy	3
GES 211	Physical Geology	4	GES 382	Petrology	3
GES 212	Historical Geology	3	GES 391*	Senior Projects I	1
ENV 315	Soils	3	GES 392*	Senior Projects II	2
ENV 320	Hydrology	3	GES 395*	Independent Research I	1-3
GES 370	Geomorphology	3	GES 396*	Independent Research II	1-3
GES 375	Geochemistry	3	*Content must be within the field of geology.		

Summer Experiences and Opportunities in the Marine Sciences and Oceanography Wallops Island Marine Science Station

Wilkes University is a member of the Wallops Island Marine Science Consortium, an association of both state and private institutions that oversee the operation of a marine field station located in southeastern Virginia. Through its membership in the Consortium, Wilkes offers to its students the full range of courses in marine sciences and oceanography regularly taught at the Station each summer. Interested students in Biology and GeoEnvironmental Sciences (as well as any other students meeting course prerequisites) are encouraged to complement regular course work with these unique summer field experiences.

Courses taken at the Wallops Island Marine Science Station can be used to fulfill some of the upper level requirements in the Biology and GES Majors. Courses typically carry three credits and involve three weeks of intensive field and laboratory study at the Marine Station and related field sites (e.g. Florida Keys). Facilities at the station include dormitory space, cafeteria, labs, lecture halls, a variety of field and laboratory equipment (e.g. two large oceanographic vessels) and a range of coastal, marine, and estuarine field sites. To enroll, students must first contact the coordinators of the Wallops Island Program at Wilkes University (prior to the spring semester) and then register for the appropriate course through the Wilkes University Registrar.

Courses regularly offered at the Station include:

MS 110 Introduction to Oceanography
MS 211 Field Methods in Oceanography
MS 221 Marine Invertebrates
MS 241 Marine Biology
MS 250 Wetland Ecology
MS 260 Marine Ecology
MS 330 Tropical Invertebrates
MS 331 Chemical Oceanography
MS 343 Marine Ichthyology
MS 345 Ornithology
MS 362 Marine Geology
MS 431 Ecology of Marine Plankton
MS 491 Coral Reef Ecology
MS 492 Marine Mammals
MS 500 Problems in Marine Science

See Coordinators of the Wallops Island Program for outlines of individual courses and more information on how to integrate these courses into Biology and GeoEnvironmental Sciences curricula.

Recommended Course Sequences for a B.A. Degree in Earth and Environmental Sciences

First Semester	TECHNICAL WRITING	POLITICAL SCIENCE	BUSINESS ADMIN.	EARTH & SPACE SCIENCE ED.
Eng 101 Composition I	3	3	3	3
Mth 105 Intro. to Calculus I	4	4	4	4
SSE 107 Technological Survival	3	3	3	3
PE 100 Activity	0	0	0	0
Bio 121 Modern Biology I	4	4	4	—
Ec 101 Economics I	—	—	3	—
PS 111 Intro. to American Politics	—	3	—	—
Psy 101 General Psychology I	—	—	—	3
Distribution Requirement	3	—	—	3
	17	17	17	16
Second Semester				
Eng 102 Composition II	3	3	3	3
GES 240 Principles of Environmental Sci.	4	4	4	4
PE 100 Activity	0	0	0	0
Bio 122 Modern Biology II	4	4	4	—
Ec 102 Economics II	—	—	3	—
PS 141 Introduction to International Politics	—	3	—	—
Psy 221 Developmental Psychology	—	—	—	3
Distribution Requirements	6	3	3	6
	17	17	17	16

Third Semester	TECHNICAL WRITING	POLITICAL SCIENCE	BUSINESS ADMIN.	EARTH & SPACE SCIENCE ED.
GES 211 Physical Geology	4	4	4	4
ME 180 CADD Lab	1	1	1	—
Phy 171 Introductory Physics	4	4	4	4
Acc 121 Introductory Financial Accounting	—	—	3	—
Eng 112 The Classical Tradition in Literature	3	—	—	—
Ed 190 Effective Teaching	—	—	—	3
PS 121 Intro. to Public Administration	—	3	—	—
Distribution Requirement	3	3	3	3
	15	15	15	14

Fourth Semester				
GES 230 Ocean Science	4	4	4	4
GES 212 Historical Geology	—	—	—	3
Phy 172 Introductory Physics	4	4	4	4
Acc 122 Intro. to Managerial Accounting	—	—	3	—
Ed 200 Educational Psychology	—	—	—	3
Ed 371 Methods of Teaching in the Sciences	—	—	—	4
Eng 115 The Western Tradition in Literature	3	—	—	—
Statistics or Computer Science Elective	3	3	3	—
Distribution Requirements	3	6	3	—
	17	17	17	18

Fifth Semester				
Chm 115 Elements & Compounds	4	4	4	4
GES 251 Synoptic Meteorology	4	4	4	4
BA 351 Management of Organizations	—	—	3	—
Eng 201 Advanced Composition	3	—	—	—
Statistics or Computer Science Elective	—	—	—	3
PS Elective	—	3	—	—
Free Elective	3	—	—	—
Distribution Requirements	3	6	6	6
	17	17	17	17

Sixth Semester	TECHNICAL WRITING	POLITICAL SCIENCE	BUSINESS ADMIN.	EARTH & SPACE SCIENCE ED.
GES Electives	7	7	7	3
GES 252 Climatology	—	—	—	3
GES 302 Literature Methods	1	1	1	1
GES 394 Field Study	1	1	1	1
Ed 354 Multicultural Education and Teaching Students with Special Needs	—	—	—	2
BA 354 Organizational Design & Behavior	—	—	3	—
Eng 202 Technical Writing	3	—	—	—
PS 322 Administrative Law & Policy	—	3	—	—
Distribution Requirements	3	3	3	6
	15	15	15	16

Seventh Semester				
GES 391 Senior Projects I	1	1	1	1
Ed 390A Intern Teaching	—	—	—	15
Eng 203 Creative Writing	3	—	—	—
COM 101 Fundamentals of Public Speaking	3	3	—	—
PS Elective	—	3	—	—
BA Elective	—	—	3	—
GES Elective	3	3	3	—
English Elective	3	—	—	—
Free Elective	3	3	3	—
Distribution Requirements	—	3	6	—
	16	16	16	16

Eighth Semester				
GES 280 Principles of Astronomy	—	—	—	4
GES 392 Senior Projects II	2	2	2	2
GES Elective	3	3	3	3
Ed 357 Content Area Reading	—	—	—	2
PS Elective	—	3	—	—
BA Elective	—	—	3	—
Eng 391 Projects in Writing	3	—	—	—
Free Elective	3	3	3	—
Statistics or Computer Science Elective	3	3	3	3
	14	14	14	14
Total Minimum Credits for B.A.	**127**	**127**	**127**	**126**

NOTE — All B.A. degree candidates are required to complete an appropriate minor or teaching certification as above (others may be considered by the department). The Earth & Space Science Teaching Certification program has additional non-course requirements.

Recommended Course Sequence for a B.S. Degree in Earth and Environmental Sciences

First Semester

Eng 101 Composition I	3
Bio 121 Modern Biology I	4
Mth 111 Calculus I	4
GES 107 Technological Survival	3
ME 180 CADD Lab	1
PE 100 Activity	0
	15

Second Semester

Eng 102 Composition II	3
Statistics or Computer Science Elective	3
Mth 112 Calculus II	4
GES 240 Environmental Science	4
PE 100 Activity	0
	14

Third Semester

GES 211 Physical Geology	4
Bio 225 Population and Evolutionary Biology	4
Chm 115 Elements & Compounds	4
Distribution Requirements	6
	18

Fourth Semester

GES 230 Ocean Science	4
Statistics or Computer Science Elective	3
Chm 116 Chemical Reaction	4
Distribution Requirements	6
	17

Fifth Semester

Phy 201 Introductory Physics	4
GES 251 Synoptic Meteorology	4
Phy 221 Instrumentation	3
Free Elective	3
Distribution Requirement	3
	17

Sixth Semester

Phy 202 Introductory Physics	4
GES/ENV Electives	6
GES 302 Literature Methods	1
GES 394 Field Study	1
Distribution Requirement	3
	15

Seventh Semester

GES 391 Senior Projects I	1
GES/ENV Elective	3
Distribution Requirements	6
Free Electives	6
	16

Eighth Semester

GES 392 Senior Projects II	2
GES/ENV Electives	6
Distribution Requirement	3
Free Elective	6
	17

NOTE — B.S. candidates are encouraged to complete a science minor (e.g., Physics, Chemistry, etc.; consult the Bulletin for program details). Candidates are also encouraged to have relevant Co-op experience, 6 credits of which may count as GES electives.

Courses at the 200 level and above are intended for science and math majors only. Exceptions by permission of the instructor. Election of a 200-level course by a non-science major will preclude registration for the corresponding 100-level course.

GES 110. SURVEY OF ASTRONOMY **Three credits**

Topics covered include stars, constellations, galaxies, sun, planets, and satellites. Intended for non-science majors. Two hours lecture and two hours laboratory/recitation. Fee: $40.

GES 115. SURVEY OF GEOLOGY **Three credits**

Topics covered include origin of earth, rocks and minerals, earthquakes, volcanoes, and continental motion. Intended for non-science majors. Two hours lecture and two hours laboratory/recitation. Fee: $40.

GES 120. SURVEY OF METEOROLOGY **Three credits**

Topics covered include temperature, precipitation, wind, weather maps, weather phenomena, and climate. Intended for non-science majors. Two hours lecture and two hours laboratory/recitation. Fee: $40.

GES 125. SURVEY OF OCEANOGRAPHY **Three credits**

Topics covered include water properties, currents, waves, marine life, and beaches. Intended for non-science majors. Two hours lecture and two hours laboratory/recitation. Fee: $40.

GES 130. THE GLOBAL ENVIRONMENT **Three credits**

Topics covered include ecology, natural resources, pollution, and global food, energy, and population problems. Intended for non-science majors. Two hours lecture and two hours laboratory/recitation. Fee: $40.

GES 211. PHYSICAL GEOLOGY **Four credits**

Description, analysis, and laboratory studies of earth materials, structures, and processes, including earth's surface, interior, age, and origin. Three hours lecture and three hours laboratory. Fee: $45. **(For science majors only)**

GES 212. HISTORICAL GEOLOGY **Three credits**

A study of the geologic record of the earth's formation and evolution, including methods of dating. Two hours lecture and two hours laboratory.

Prerequisite: GES 211 or consent of instructor.

GES 230. OCEAN SCIENCE **Four credits**

An interdisciplinary approach to the study of the fundamentals of oceanography emphasizing physical, chemical, and biological interrelationships. Three hours lecture and three hours laboratory. Fee: $45. **(For science majors only)**

GES 240. PRINCIPLES OF ENVIRONMENTAL SCIENCE **Four credits**

A study of living systems as they are integrated with their physical environments and impacted by human activity. Three hours lecture and three hours laboratory. Fee: $45. **(For science majors only)**

GES 251. SYNOPTIC METEOROLOGY **Four credits**

Topics include surface and upper-air weather systems, weather phenomena, climate, and local weather influences. Synoptic map analysis and interpretation are emphasized. Three hours lecture and three hours laboratory. Fee: $45. (same as Phy 225) **(For science majors only)**

GES 252. CLIMATOLOGY **Three credits**

Investigation of controls and classification of climatic patterns. Also, study of data handling techniques, scales of climatic change, and practical applications of climatological results. Three hours lecture.

Prerequisite: GES 251.

GES 261. REGIONAL GEOGRAPHY **Three credits**
Topics covered include maps and charts, and basic elements of physical, cultural, historical, and economic geography as applied to specific geographic regions. Three hours lecture and laboratory.

GES 280. PRINCIPLES OF ASTRONOMY **Four credits**
Topics include orbital mechanics, results of planetary probes, spectra and stellar evolution, and cosmology. Three hours lecture and three hours laboratory. Fee: $45. (same as Phy 228) **(For science majors only)**

GES 302. LITERATURE METHODS **One credit**
The nature and use of important sources of information in earth and environmental sciences are developed through retrospective searching methods and current awareness techniques. The use of computer data bases, the design of personal computer information files, information search strategies, and manual search procedures are included. Literature preparation for Senior Projects (GES 391-392).
Prerequisite: Junior standing.

GES 325. DYNAMIC METEOROLOGY **Three credits**
Topics include themodynamics; heat, moisture, and momentum transfer; and atmospheric forces and motion fields. Three hours lecture and one hour discussion.
Prerequisites: GES 251, Mth 105 or 111, or permission of instructor.

GES 341. LIMNOLOGY **Three credits**
A study of the chemical, physical, and biological aspects of freshwater systems. Laboratory investigations will consist of in-depth analyses of local lakes and streams. Two hours lecture and two hours laboratory. Fee: $45. (same as Bio 340)
Prerequisite: Bio 121-122 and consent of instructor.

GES 343. MARINE ECOLOGY **Three credits**
An examination of the biology of marine life within the context of modern ecological principles. The structure and physiology of marine organisms will be studied from the perspectives of adaptation to the ocean as habitat, biological productivity, and interspecific relationships. Emphasis will be placed on life in intertidal zones, estuaries, surface waters, and the deep sea. Two hours of lecture and three hours of laboratory per week. Fee: $45.
Prerequisites: GES 230 (Ocean Science) and Bio 121-122; or junior biology major standing. Students must have formal course experience in oceanography and biology at the science major level **or** have completed their sophomore year as a biology major.

GES 344. ECOLOGY **Four credits**
Ecology examines contemporary ecological thinking as it pertains to the interrelationships of organisms and their environments. Interactions at the population and community level are emphasized. Lecture, two hours; laboratory, three hours a week. Laboratory fee: $40.
Prerequisites: Bio 121-122, 223-224, or permission of instructor.

GES 366. FIELD BOTANY **Three credits**
This is a specialized summertime field course which emphasizes a taxonomic, phylogenetic, and ecological survey of higher plants indigenous to Northeastern Pennsylvania. Due to the extensive field work, enrollment is somewhat more restricted than in other courses; therefore, written permission from the instructor is the prime prerequisite of those upperclassmen wishing to register for the course.
Prerequisites: Bio 121-122, 223-224, or permission of instructor.

GES 370. GEOMORPHOLOGY **Three credits**
Land forms, their evolution, and the human role in changing the surface of the earth, utilization of geologic and hydrologic information, and field investigations. Two hours lecture and two hours laboratory. Fee: $45.
Prerequisites: GES 211 and ENV 321.

GES 375. GEOCHEMISTRY **Three credits**
Chemical properties of earth materials. Origin and abundance of the chemical elements and their distribution. Mineral equilibria. Stable and radioactive isotope variations due to geologic processes. Two hours lecture and two hours laboratory. Fee: $45.
Prerequisites: GES 211 and Chm 116, or consent of instructor.

GES 381. MINERALOGY **Three credits**
Ionic structure of minerals; physical properties and external form as consequences of structure; determination of minerals by physical tests. Two hours lecture and two hours laboratory. Fee: $45.
Prerequisites: GES 211 and Chm 111 or 115.

GES 382. PETROLOGY **Three credits**
A study of the identification, classification, composition, genesis, and alteration of igneous, sedimentary, and metamorphic rocks and their relation to crustal processes and environments. Two hours lecture and two hours laboratory. Fee: $45.
Prerequisites: GES 211 and 381.

GES 391. SENIOR PROJECTS I **One credit**
Design and development of selected projects in earth and environmental sciences and other related fields under the direction of a staff member. Technical as well as economical factors will be considered in the design. A professional paper and detailed progress report are required.
Prerequisite: Senior standing in GES.

GES 392. SENIOR PROJECTS II **Two credits**
Design and development of selected projects in earth and environmental sciences and other related fields under the direction of a staff member. Technical as well as economical factors will be considered in the design. A professional paper to be presented and discussed in an open forum is required.
Prerequisite: GES 391 or approval of the instructor.

GES 393. PROFESSIONAL OFF-CAMPUS STUDY **One to six credits**
This course is intended for students affiliated with the Cooperative Education Program. Students will present a written and oral report to the department faculty and guests at the conclusion of their project. Course may be repeated (with a maximum of six credits applied toward graduation).
Prerequisites: Senior standing and approval of department advisor and chairperson.

GES 394. FIELD STUDY **One to three credits**
On-site study of an earth or environmental problem or situation incorporating field documentation and investigation techniques. May be repeated for credit when no duplication of experience results. One hour lecture, plus field trip(s). Fee: variable.
Prerequisites: GES 211 and GES 240.

GES 395-396. INDEPENDENT RESEARCH I & II **One to three credits each**
Independent study or research of a specific earth or environmental science topic at an advanced level under the direction of a departmental faculty member. For three credits, a defensible research paper is required.
Prerequisites: Upper-class standing and approval of academic advisor, research advisor, and department chairperson.

GES 397. SENIOR SEMINAR **One to three credits**

Presentations and discussions of selected topics and projects.

Prerequisite: Senior standing.

GES 399. COOPERATIVE EDUCATION **One to six credits**

Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

GES 198/298/398. TOPICS IN GES **Variable credit**

Departmental courses on topics of special interest, not extensively treated in regularly scheduled offerings, will be presented under this course number on an occasional basis. May be repeated for credit.

Prerequisite: Varies with topic studied.

GES 498. ADVANCED TOPICS **One to three credits**

Departmental courses on advanced topics of special interest, not extensively treated in regularly scheduled offerings, will be presented under this course number on an occasional basis. Available for either undergraduate or graduate credit. May be repeated for credit.

Prerequisite: Senior or graduate standing.

EAST EUROPEAN AND RUSSIAN STUDIES PROGRAM

East European and Russian Studies Program Coordinating Committee: Professors Hupchick, (Director), Baldino, R. Heaman, Karpinich, Merryman.

Total minimum number of credits required for a minor — 18.

The East European and Russian Studies Program is an interdisciplinary program in which undergraduate students may earn a minor. Program requirements, which can be simultaneously used to fulfill the student's major and elective requirements, are: eighteen (18) credit hours distributed over three academic disciplines (i.e., history, foreign languages and political science), with a minimum of three (3) credit hours in each and no more than nine (9) in any single discipline. One year of college-level Russian (101 and 102) or other East European language (if offered), or second-year college-level German (203 and 204), is strongly recommended. A maximum of nine (9) credit hours in applicable course work acquired through participation in Study Abroad programs may be applied toward fulfillment of the minor requirements, of which a maximum of six (6) may be accepted in any single discipline. The acceptability of Study Abroad credits toward fulfilling program requirements is determined by the East European and Russian Studies Program Coordinating Committee.

The minor is designed to add recognition of a multidisciplinary, international component to the student's degree and to supplement work in the student's major department. It further adds a professionally and personally valuable concentration for students majoring in such areas as business, history, political science, foreign languages, international studies, economics, and communications, among others.

The Coordinating Committee Director serves as the student advisor for the program. Students who select the minor should contact the Director, who will aid them in the selection of courses.

Departmental course offerings that are currently eligible for the East European and Russian Studies minor include:

Foreign Languages:

Russian 101: Elementary Russian
Russian 102: Elementary Russian
Russian 208: Russian and East European Cultures
German 203: Intermediate German
German 204: Intermediate German
History 345: Eastern Europe I
History 346: Eastern Europe II
History 348: History of Russia
Political Science 251: European Politics
Political Science 351: Politics of Russia and Commonwealth of Independent States

Other eligible courses may be offered as topics courses or added to the departmental offerings listed above. Course additions will be approved and publicized by the Coordinating Committee during the pertinent academic year.

Beyond overseeing the program curriculum, the Coordinating Committee also administers outreach programs, such as lecture series, seminars and cultural events, that serve to broaden the goals and content of the program to the University community and to the community at large.

ECONOMICS

Associate Professor Raspen, Chairperson; Professor Emeritus Farrar; Associate Professor Emeritus DeYoung; Professor Taylor; Associate Professor Seeley; Assistant Professor Latzko.

Total minimum number of credits required for the Bachelor of Arts degree with a major in Economics — 122.

Total minimum number of credits required for a minor — 24.

The Business and Economics Department offers both a major and minor program in Economics. The major program is designed for those students seeking a rigorous exposure to the theoretical explanations of the behavior of economic systems, and the economic decisions and policies which flow from these theories. The inherent flexibility of the Bachelor of Arts degree program with a major in Economics permits students, in consultation with their faculty advisors, to design an educational program tailored to their particular needs and interests.

The Economics curriculum is quite quantitative. It is presumed that students considering a major in Economics will have completed Geometry, Algebra II, and Trigonometry in their secondary school preparation; an introductory calculus course is also recommended. Students majoring in Economics must ensure that their liberal arts core includes mathematical preparation through at least Calculus for Life, Managerial, and Social Sciences (Mth 105-106) as required by the degree program.

The Economics curriculum is composed of three tiers or steps intended to combine simultaneously a rigorous general education with the flexibility of individualized program design. The first tier is the liberal arts General Education Requirements of the University core. As explained on pages 48-50 of this **Bulletin,** this tier consists of 45 credits — 6 credits in written expression (English 101 and English 102 or a higher sequence) and 39 credits in the "Distribution Areas": **Area I: Heritage and Value — 15 credits; Area II: The Scientific World — 12 credits; Area III: Society and Human Behavior — 9 credits; and Area IV: Artistic Expression — 3 credits.**

The second tier of the curriculum is the Economics core of 12 credits, which is completed by all Economics majors, and whose courses provide opportunities to experience the full range of the discipline and to consider where economists may bring to bear their unique expertise. Although the following eight courses are required by the Economics core, four of them fulfill Distribution Area requirements of the University core as indicated, and so those 14 credits are counted in the first tier grouping. They appear here for completeness:

CS 115	Survey of Computers
Ec 101	Economics I **(Distribution Area III)**

Ec 102	Economics II **(Distribution Area III)**
Ec 201	Macroeconomics I
Ec 202	Microeconomics I
Ec 319	Economic Statistics
Mth 105 or 111	Calculus I **(Distribution Area II)**
Mth 106 or 112	Calculus II **(Distribution Area II)**

The third and final tier of the Economics program is represented by another 15 credits of deliberately-chosen Economics electives. This is the stage at which students select, with the counsel of their academic advisors, those Economics courses that focus upon their particular interests, personal career goals and individual ambitions.

The Economics program also contains 49 credits of free electives for further customization of one's educational program. For example, students majoring in Economics may earn a Pennsylvania Teaching Certificate for teaching elementary school or for teaching Social Studies in grades 7-12. Refer to the requirements of the Education Department on pages 158-161 of this **Bulletin.**

Economists find that opportunities exist in all sectors of society for them to apply their skills and knowledge. Businesses of every description have economists on staff. Governmental bodies and not-for-profit organizations are major employers of economists. Teaching careers in higher education are often chosen by economists who have attained the doctoral degree.

As implied by the preceding sentence, further study at the graduate level, at least through the masters degree, is virtually a necessity. Because Wilkes graduates have had ready access to many prestigious graduate schools, our alumni are to be found in a variety of meaningful careers where they are making significant contributions to the field of Economics and to society as a whole.

Minor in Economics

For students who have chosen other majors, a minor in Economics often is a valuable complement. Its ability to bring into sharp focus the economic issues and problems subsumed in such areas as history, pre-law, music, or engineering make it a valuable career asset. The minor program in Economics requires the completion of Ec 101 and Ec 102 and at least 18 additional credits in Economics courses, chosen in consultation with the academic advisor in the Business and Economics Department.

Recommended Course Sequence for a Bachelor of Arts Degree with a Major in Economics

First Semester

CS 115 Survey of Computers	3
Ec 101 Principles of Economics I **(Dist)**	3
Eng 101 Composition I	3
Mth 105 or 111 Calculus I **(Dist)**	4
Distribution Requirement	3
PE 100 Activity/Wellness	0
	16

Second Semester

Ec 102 Principles of Economics II **(Dist)**	3
Eng 102 Composition II	3
Mth 106 or 112 Calculus II **(Dist)**	4
Distribution Requirements	6
PE 100 Wellness/Activity	0
	16

Third Semester

Ec 201 Macroeconomics I or	3
Ec 202 Microeconomics I	
Distribution Requirements	9
Free Elective	3
	15

Fourth Semester

Ec 202 Microeconomics I or	3
Ec 201 Macroeconomics I	
Distribution Requirements	9
Free Elective	3
	15

Fifth Semester

Ec 319 Economic Statistics	3
Major Elective	3
Free Electives	9
	15

Sixth Semester

Major Elective	6
Free Electives	9
	15

Seventh Semester

Major Elective	3
Free Electives	12
	15

Eighth Semester

Major Elective	3
Free Electives	12
	15

EC 101. PRINCIPLES OF ECONOMICS I **Three credit**

Presents basic economic problems and shows how these problems are solved in a free enter prise economy; the effects of the increasing importance of the economic role of government the nature of national income and the modern theory of income determination; how money an banking, fiscal policy, and monetary policy fit in with income analysis and keep the aggregat system working. The course deals mainly with macroeconomic problems.

EC 102. PRINCIPLES OF ECONOMICS II **Three credit**

Based upon a broad microeconomic foundation concentrating on such units as the consumer the firm, and the industry. A general view of the free market system; the economics of the firm and resource allocation under different market structures; production theory; pricing and em ployment of resources; economic growth and development.

EC 201. MACROECONOMICS I **Three credits**

The study of behavior of the important economic aggregates; national income, consumption, investment, public spending, and taxes. Special emphasis is on the problems of inflation and unemployment and the post-Keynesian search for their causes and solutions.

Prerequisite: Ec 101.

EC 202. MICROECONOMICS I **Three credits**

The study of the interaction between households and businesses in product and resource markets. Topics covered include consumer preferences, production theory, cost analysis, market structures and the determination of wages and prices.

Prerequisite: Ec 102.

EC 203. MACROECONOMICS II **Three credits**

An introduction to the Keynesian and Neoclassical growth theory and the various explanations of behavior of consumption, investment, unemployment, and inflation. The course is designed to present an alternative treatment of some topics covered in Macroeconomics I and to extend the student's knowledge into areas not covered.

Prerequisite: Ec 201.

EC 204. MICROECONOMICS II **Three credits**

The study of the market system as a whole, through welfare economics and general equilibrium analysis with emphasis on social preferences, market failure, and policy alternatives.

Prerequisite: Ec 202.

EC 230. MONEY AND BANKING **Three credits**

A study of money, credit, and banking operations. Monetary standards, development of the American monetary and banking system. Recent developments in other financial institutions. Central banking and the Federal Reserve System; instruments of monetary control; interna- ional monetary relationships.

Prerequisites: Ec 101 and 102.

EC 301. COMPARATIVE ECONOMIC SYSTEMS **Three credits**

The institutions of a market economy are analyzed as a foundation for purposes of compari- ons. Marxist theory of prices, wages, and the demise of capitalism is studied in order to estab- ish the theoretical basis of Socialism and Communism. Particular stress is placed on the per- ormance of the former Soviet economy. Attention is also given to important operational spects of the Chinese, British, and Swedish systems.

Prerequisites: Ec 101 and 102.

EC 310. ECONOMIC DEVELOPMENT **Three credits**

A study of the problems of development and growth in developed and less developed countries nd how they can achieve growth and development. Topics include population, financing de- elopment, planning and programming development, as well as theories of economic develop- nent.

Prerequisites: Ec 101 and 102.

EC 311. ECONOMIC GEOGRAPHY OF NORTH AMERICA, EUROPE, AND THE FORMER SOVIET UNION **Three credits**

A study and analysis of the characteristics, potentials, and problems of the more advanced na- ions of the Northern Hemisphere.

Prerequisites: Ec 101 and 102.

EC 312. ECONOMIC GEOGRAPHY OF ASIA, AFRICA, AND LATIN AMERICA **Three credits**

A study and analysis of the characteristics, potentials, and problems of the less developed na- ions of the world.

Prerequisites: Ec 101 and 102.

EC 315. BUSINESS CYCLES **Three credits**
Historical analysis of major business cycles. Contemporary theories and a critical examination of public policy toward business cycles. Forecasting with econometric models.
Prerequisites: Ec 101 and 102; BA/Ec 319.

EC 319. ECONOMIC STATISTICS **Three credits**
An introduction to the primary tools of research in business and economics: the collection, summarization, analysis, and interpretation of statistical findings relevant to business decisions. Two hours of lecture and one hour of individualized laboratory. Topics covered will include, but not be limited to, descriptive statistics, probability, sampling theory, hypothesis testing, and regression and correlation analysis. (Same as BA 319.)

EC 320. ECONOMETRICS **Three credits**
An examination of the statistical techniques used by economists to measure the strength of economic relationships and to test the validity of economic theories. Multi-variate regression will be used to analyze actual economic data. Introduction to model building.
Prerequisites: Ec 101 and 102; BA/Ec 319.

EC 325. ECONOMIC RESEARCH **Three credits**
The purpose of this course is to provide an introduction to the methods and logic of linear programming, input-output analysis, queuing theory, index numbers, and other techniques of research in economics.
Prerequisites: Ec 101 and 102; BA/Ec 319.

EC 330. PUBLIC FINANCE **Three credits**
Fundamental principles of public finance; government expenditures; revenue; financial policies and administration; taxation; principles of shifting and incidence of taxation; public debts and the budget; fiscal problems of federal, state, and local government; the relation of government finance to the economy.
Prerequisites: Ec 101 and 102.

EC 340. INTERNATIONAL TRADE AND FINANCE **Three credits**
Classical and Neo-classical theories of trade; qualifications of the pure theory; new theories of trade; the transfer of international payments and the determination of foreign exchange rates; the balance of international payments; tariffs and other trade barriers; United States commercial policy and the General Agreement on Trade and Tariffs; current issues.
Prerequisites: Ec 101 and 102.

EC 380. LABOR ECONOMICS **Three credits**
A study of the forces that determine labor market outcomes such as wage rates, employment levels, and productivity of the workforce. Emphasis will be placed upon the various measures of labor supply as well as the differences in the demand for labor in competitive versus noncompetitive markets. Key topics will include: the various types of unemployment; search theory; the impact of legal and illegal immigration; collective bargaining and the economics of unions; labor market discrimination and comparable worth.
Prerequisites: Ec 101 and 102.

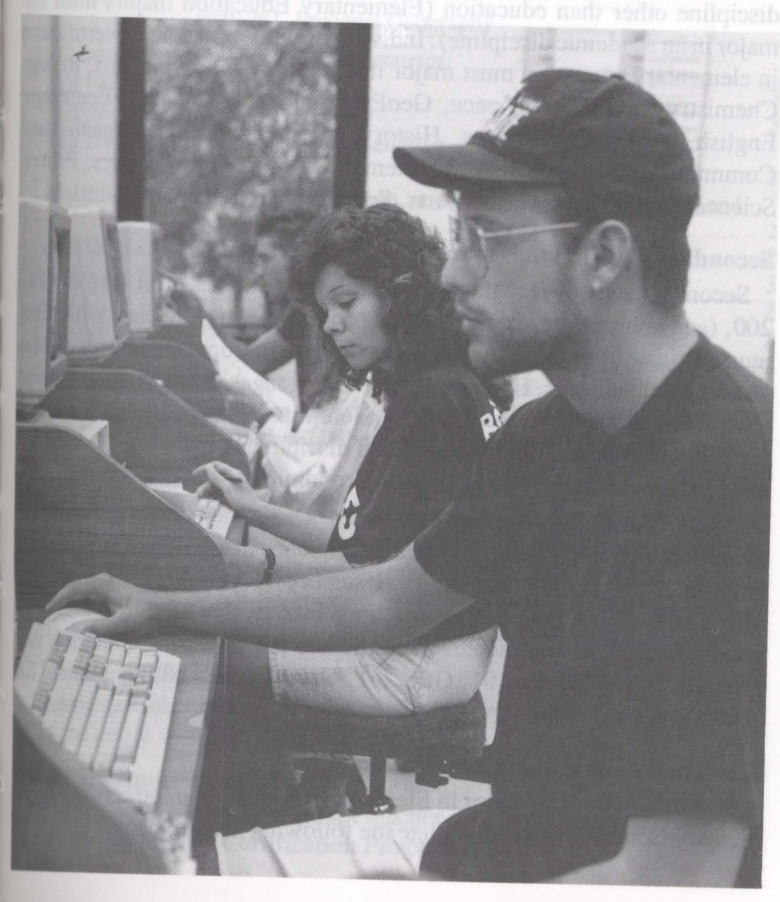
EC 385. COLLECTIVE BARGAINING **Three credits**
An introduction to labor problems and an analysis of major issues in the field of labor. This course deals with collective bargaining, employment, wages, hours, and union policies. Governmental participation in labor relations and collective bargaining are also investigated. Reference is made to social welfare devices such as social security, unemployment compensation, and workers' compensation.
Prerequisites: Ec 101 and 102.

EC 395-396. INDEPENDENT RESEARCH **One to three credits**
Independent study and research for advanced students in the field of the major under the direction of a full-time faculty member. A research paper at a level significantly beyond a term paper is required.
Prerequisites: Ec 101 and 102.

EC 397. SEMINAR **(Maximum of three credits per student) One to three credits**
Presentations and discussions of selected topics.
Prerequisites: Ec 101 and 102.

EC 399. COOPERATIVE EDUCATION **One to six credits**
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)
Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

EC 198/298/398. TOPICS **Variable credit**
Lectures on current issues and developments in economics.



EDUCATION

Associate Professor Lynch, Chairperson; Professors Emeriti Darte, Hammer; Professors Fahmy, Placek; Associate Professors Johnson, Meyers, Polachek; Associate Professor Williams, Director of Teacher Extension Programs.

Total minimum number of credits required for a major in Elementary Education — 129.

The Education Department offers a major in Elementary Education and programs leading to teacher certification in art, biology, chemistry, communications, early childhood, earth and space science, elementary education, English, French, German, mathematics, physics, social studies, and Spanish. Copies of curricula for these programs are available in the appropriate department and in the Education Department office. Given demographic trends in the United States, prospective teachers should consider learning a second language.

All teacher education programs at Wilkes require students to major in a discipline other than education (Elementary Education majors **must** also major in an academic discipline). Individuals who want teacher certification in elementary education must major in one of the following: Art, Biology, Chemistry, Computer Science, GeoEnvironmental Sciences, Economics, English, Foreign Languages, History, Interpersonal and Organizational Communication, Journalism, Mathematics, Philosophy, Physics, Political Science, Psychology, Theater Arts, Sociology, or Telecommunications.

Secondary Certification

Secondary school teaching certification candidates must take ED 190, 200, (and appropriate special methods courses), 210, 380 and 390A. They must also major in one of the following: Art, Biology, Chemistry, GeoEnvironmental Sciences, English, Foreign Languages, Mathematics, Physics, Communications or Social Studies. (Note that Wilkes certifies teachers to teach Social Studies, not the individual disciplines of History, Political Science, Psychology, Sociology, and/or Economics.)

Social Studies certification candidates who major in history must take twelve credits beyond the introductory sequence in one of the social sciences (anthropology, economics, political science, psychology, or sociology). Those who do not major in history must take twelve credits in history beyond 101-102. All candidates must include the following courses in their program: Ant 101, Ec 101, GES 261, Hst 207 and 208, PS 111, and Soc 101.

Elementary Education Certification

Students wishing to major in Elementary Education or be certified in Elementary Education must complete the following requirements:

1. Complete an academic major as described above;
2. Complete the following general education requirements, several of which may be incorporated into Distribution and Major requirements:

Math — 6 credits
Mth 103, 104, or higher numbered courses

History — 3 credits
Hst 207 or Hst 208 American History

Science — 12 credits
3 cr. Biology
3 cr. GeoEnvironmental Sciences
3 cr. Chemistry or Physics
3 cr. Additional Biology, GeoEnvironmental Sciences, Chemistry or Physics

Economics — 3 credits
Ec 101 Principles of Economics

Psychology — 6 credits
Psy 101 Principles of Psychology
Psy 221 Developmental Psychology

Geography — 3 credits
GES 261 Regional Geography

3. Complete the following education courses:

Ed 190	Effective Teaching	3
Ed 200	Educational Psychology	3
Ed 210	Multicultural Education and Teaching Students with Special Needs	2
Ed 310	Health, Physical Education, and Safety in Early Childhood and Elementary Education	2
Ed 320	Children's Literature	2
Ed 321	Foundations of Reading	3
Ed 322	Teaching Reading	2
Ed 330	Mathematics in Early Childhood and Elementary Education	2
Ed 341	Language Arts in Early Childhood and Elementary Education	2
Ed 350	Arts in Early Childhood and Elementary Education	2
Ed 360	Social Studies in Early Childhood and Elementary Education	2
Ed 370	Science in Early Childhood and Elementary Education	2
Ed 390B	Intern Teaching	15

Early Childhood Education

Early Childhood Education candidates complete the elementary school teaching program described above and take Ed 263, 361, and 362. Students must complete supervised practicums associated with Ed 361 and Ed 362. This is in addition to student teaching, Ed 390B.

Art Education/Music Education

Teaching candidates in art or music will find their programs described in the art and music sections of the **Bulletin**.

Admission Requirements

Students interested in preparing for teacher certification **must** be formally admitted to the Teacher Certification Program.

EDUCATION

Associate Professor Lynch, Chairperson; Professors Emeriti Darte, Hammer; Professors Fahmy, Placek; Associate Professors Johnson, Meyers, Polachek; Associate Professor Williams, Director of Teacher Extension Programs.

Total minimum number of credits required for a major in Elementary Education — 129.

The Education Department offers a major in Elementary Education and programs leading to teacher certification in art, biology, chemistry, communications, early childhood, earth and space science, elementary education, English, French, German, mathematics, physics, social studies, and Spanish. Copies of curricula for these programs are available in the appropriate department and in the Education Department office. Given demographic trends in the United States, prospective teachers should consider learning a second language.

All teacher education programs at Wilkes require students to major in a discipline other than education (Elementary Education majors **must** also major in an academic discipline). Individuals who want teacher certification in elementary education must major in one of the following: Art, Biology, Chemistry, Computer Science, GeoEnvironmental Sciences, Economics, English, Foreign Languages, History, Interpersonal and Organizational Communication, Journalism, Mathematics, Philosophy, Physics, Political Science, Psychology, Theater Arts, Sociology, or Telecommunications.

Secondary Certification

Secondary school teaching certification candidates must take ED 190, 200, (and appropriate special methods courses), 210, 380 and 390A. They must also major in one of the following: Art, Biology, Chemistry, GeoEnvironmental Sciences, English, Foreign Languages, Mathematics, Physics, Communications or Social Studies. (Note that Wilkes certifies teachers to teach Social Studies, not the individual disciplines of History, Political Science, Psychology, Sociology, and/or Economics.)

Social Studies certification candidates who major in history must take twelve credits beyond the introductory sequence in one of the social sciences (anthropology, economics, political science, psychology, or sociology). Those who do not major in history must take twelve credits in history beyond 101-102. All candidates must include the following courses in their program: Ant 101, Ec 101, GES 261, Hst 207 and 208, PS 111, and Soc 101.

Elementary Education Certification

Students wishing to major in Elementary Education or be certified in Elementary Education must complete the following requirements:

1. Complete an academic major as described above;
2. Complete the following general education requirements, several of which may be incorporated into Distribution and Major requirements:

Math — 6 credits
Mth 103, 104, or higher numbered courses

History — 3 credits
Hst 207 or Hst 208 American History

Science — 12 credits
3 cr. Biology
3 cr. GeoEnvironmental Sciences
3 cr. Chemistry or Physics
3 cr. Additional Biology, GeoEnvironmental Sciences, Chemistry or Physics

Economics — 3 credits
Ec 101 Principles of Economics

Psychology — 6 credits
Psy 101 Principles of Psychology
Psy 221 Developmental Psychology

Geography — 3 credits
GES 261 Regional Geography

3. Complete the following education courses:

Ed 190	Effective Teaching	3
Ed 200	Educational Psychology	3
Ed 210	Multicultural Education and Teaching Students with Special Needs	2
Ed 310	Health, Physical Education, and Safety in Early Childhood and Elementary Education	2
Ed 320	Children's Literature	2
Ed 321	Foundations of Reading	3
Ed 322	Teaching Reading	2
Ed 330	Mathematics in Early Childhood and Elementary Education	2
Ed 341	Language Arts in Early Childhood and Elementary Education	2
Ed 350	Arts in Early Childhood and Elementary Education	2
Ed 360	Social Studies in Early Childhood and Elementary Education	2
Ed 370	Science in Early Childhood and Elementary Education	2
Ed 390B	Intern Teaching	15

Early Childhood Education

Early Childhood Education candidates complete the elementary school teaching program described above and take Ed 263, 361, and 362. Students must complete supervised practicums associated with Ed 361 and Ed 362. This is in addition to student teaching, Ed 390B.

Art Education/Music Education

Teaching candidates in art or music will find their programs described in the art and music sections of the **Bulletin**.

Admission Requirements

Students interested in preparing for teacher certification **must** be formally admitted to the Teacher Certification Program.

Students will **not** be permitted to enroll in education courses beyond Ed 190, Effective Teaching, until they are admitted to the teacher education program. Criteria for admission are:

1. Completion of at least 45 semester-hour credits;
2. A GPA of 2.5 to be admitted (and maintainance of a cumulative 2.5 GPA to continue in the program);
3. Successful completion of Ed 190, Effective Teaching, with a grade of at least 2.5;
4. Demonstration of writing and oral proficiency (See Teacher Education Program Handbook, purchased at the Bookstore.)

To be admitted to the teacher education program, applicants have to meet all requirements. Consideration of exceptions will start with review by the Department Chair and end with the decision of a departmental committee.

Interested students are encouraged to seek advice in the Education Department early in their first semester at the University.

Refer to Teacher Education Program Handbook for Student Teaching policies and state regulations.

Certification

Upon successful completion of the programs described above, candidates will be recommended for certification by the state after they pass the National Teacher Examination.

Recommended Course Sequence for Major/Certification in Elementary Education

First Semester		Second Semester	
Eng 101 Composition I	3	Eng 102 Composition II	3
Psy 101 General Psychology	3	Psy 221 Developmental Psychology	3
Mathematics Elective	3	Mathematics Elective	3
Science Elective	3	Computer Science Elective	3
Distribution Requirement	3	Major Elective	3
PE 100 Activity	0	PE 100 Activity	0
	15		15
Third Semester		**Fourth Semester**	
Ed 190 Effective Teaching	3	Science Elective	3
Ec 101 Principles of Economics I	3	Ed 200 Educational Psychology	3
Science Elective	3	Major Elective	3
Major Elective	3	Distribution Requirement	3
Distribution Requirement	3	GES 261 Regional Geography	3
Hst 207 or 208 American History	3		
	18		15

Fifth Semester		Sixth Semester	
Elementary Education Requirements	9	Elementary Education Requirements	6
Distribution Requirement	3	Distribution Requirement	3
Major Electives	6	Major Electives	9
	18		18
Seventh Semester		**Eighth Semester**	
Science Elective	3	Ed 390B Intern Teaching	15
Major Electives	6		15
Elementary Education Requirements	6		
	15		

Recommended Course Sequence for Major/Certification in Secondary Education

First Semester		Second Semester	
Eng 101 Composition I	3	Eng 102 Composition II	3
Psy 101 General Psychology	3	Psy 221 Developmental Psychology	3
Distribution Requirements	5-7	Distribution Requirements	6-8
Major Electives	3-4	Major Electives	3-4
PE 100 Activity	0	PE 100 Activity	0
	14-17		15-18
Third Semester		**Fourth Semester**	
Ed 190 Effective Teaching	3	Ed 200 Educational Psychology	3
Distribution Requirements	9-10	Distribution Requirements	9-10
Major Elective	3	Major Elective	3
	15-16		15-16
Fifth Semester		**Sixth Semester**	
Distribution Requirement	3	Distribution Requirement	3
Major Electives	6-9	Major Electives	6-9
Free Electives or Special Methods	3-4	Free Elective	3
Ed 210 Multicultural Ed. & Teaching Students with Special Needs	2	Ed 380 Content Area Reading	2
	14-18		14-17
Seventh Semester		**Eighth Semester**	
Distribution Requirement	3	Ed 390A Intern Teaching	15
Major Electives	6		15
Free Elective	3		
Special Methods	4-5		
	16-17		

ED 150. PRACTICUM IN EDUCATION — **One credit**
Provides an opportunity for students to gain experience as teachers' aides in school classrooms under supervision.

ED 190. EFFECTIVE TEACHING — **Three credits**
This course emphasizes concepts and skills for effective teaching. These skills include instructional techniques, library research, writing, and field experiences. Students will be involved in their first practicum experience.

ED 200. EDUCATIONAL PSYCHOLOGY — **Three credits**
A study of the principles of learning and the application of psychological principles to teaching.
Prerequisite: Psy 101 and admission to the Teacher Education Program.

ED 210. MULTICULTURAL EDUCATION AND TEACHING STUDENTS WITH SPECIAL NEEDS — **Two credits**
This course is designed to enable students to develop the knowledge base and instructional skills necessary to meet the educational needs within the classroom of students with special needs. In addition, this course will address issues of multicultural education and prepare students to develop within their students an appreciation of and respect of cultural diversity.
Prerequisite: Admission to the Teacher Education Program.

ED 263. CHILD DEVELOPMENT — **Two credits**
This course is designed as a comprehensive study of child development extending from the prenatal months through six years of age. The relationship between growth and development and how children learn best in the formative years is the major focus of the course. The course will also explore, identify and evaluate methods of testing appropriate to use in the formative years.
Prerequisites: Admission to the Teacher Education Program and Psy 221.

ED 290. ANALYSIS OF RESEARCH — **Three credits**
This course provides instruction designed to help students learn how to locate and evaluate factual information; research procedures are examined; research reports are analyzed; students identify and criticize reports in their field of study.
Prerequisite: Admission to the Teacher Education Program.

ED 310. HEALTH, PHYSICAL EDUCATION AND SAFETY IN EARLY CHILDHOOD AND ELEMENTARY EDUCATION — **Two credits**
This is a study of the methods and materials appropriate for teaching health, physical education and safety. Emphasis is on understanding the developmental levels, needs and interests of children in these areas from infancy to early adolescence.
Prerequisite: Admission to the Teacher Education Program.

ED 320. CHILDREN'S LITERATURE — **Two credits**
This course examines the role of literature in the lives of children from infancy through early adolescence. Emphasis is on criteria for selecting literature for the classroom and suggestions for presenting literary works and basic literary concepts in various educational settings.
Prerequisite: Admission to the Teacher Education Program.

ED 321. FOUNDATIONS OF READING — **Three credits**
This course will present basic concepts of reading instruction: emphasis on the nature of the reading process; the nature of the learner; and reading as an interactive process. This course requires completion of a 30-hour practicum.
Prerequisite: Admission to the Teacher Education Program.

ED 322. TEACHING OF READING — **Two credits**
The course is designed to investigate and analyze major instructional methods for teaching reading. The material is based upon current research theories and findings, and includes topics now recognized by theorists and practitioners as being most critical to developing effective school reading programs.
Prerequisite: Successful completion of Ed 321 and admission to the Teacher Education Program.

ED 325. METHODS AND MATERIALS OF INSTRUCTIONAL TECHNIQUES FOR EXCEPTIONAL CHILDREN — **Three credits**
Examination of instructional materials for use with exceptional children and study of instructional techniques for providing effective educational experiences.
Prerequisite: Admission to the Teacher Education Program.

ED 330. MATHEMATICS IN EARLY CHILDHOOD AND ELEMENTARY EDUCATION — **Two credits**
This course is designed to present a study of the research, concepts, and methodologies pertinent to the teaching of mathematics at the early childhood and elementary school levels. Emphasis is placed on 1) the use of concrete manipulatives to facilitate the learning process, 2) the knowledge necessary to guide children to become mathematically literate, and 3) the implementation of planning and instructional techniques in the teaching of mathematics.
Prerequisite: Admission to the Teacher Education Program.

ED 341. LANGUAGE ARTS IN EARLY CHILDHOOD AND ELEMENTARY EDUCATION — **Two credits**
The purpose of this course is to inform and actively involve learners in studying a variety of concepts and methodologies for teaching the language arts at the early childhood and elementary school level. The course focuses on a broad interpretation and integration of the language arts and endorses a multidisciplinary approach to teaching and learning.
Prerequisite: Admission to the Teacher Education Program.

ED 350. THE ARTS IN EARLY CHILDHOOD AND ELEMENTARY EDUCATION — **Two credits**
An exploration of common situations in elementary education to discover the opportunities for creative work and the methods and materials by which they may be realized. An extension of personal experience with a variety of arts and crafts materials and processes used by children.
Prerequisite: Admission to the Teacher Education Program.

ED 353. BASIC EDUCATION CURRICULA: ART — **Three credits**
An examination of curricula in Art Education (K-12).
Prerequisite: Admission to the Teacher Education Program.

ED 360. SOCIAL STUDIES IN EARLY CHILDHOOD AND ELEMENTARY EDUCATION — **Two credits**
A study of different theoretical approaches to early childhood and elementary social studies education with the goal of designing and practicing alternate methods of instruction in social studies.
Prerequisite: Admission to the Teacher Education Program.

ED 361. EARLY CHILDHOOD EDUCATION — **Three credits**
This course enables the student to understand the purpose for and operation of nursery schools, child care centers, and other pre-school institutions. Fifteen-hour practicum required.
Prerequisite: Admission to the Teacher Education Program.

ED 362. INSTRUCTION IN EARLY CHILDHOOD EDUCATION **Three credits**

This course prepares the student to work in a nursery school, child care center, or other preschool institution. Thirty-hour practicum required.

Prerequisite: Admission to the Teacher Education Program.

ED 370. SCIENCE IN EARLY CHILDHOOD AND ELEMENTARY EDUCATION **Two credits**

Methods and curriculum for teaching science to young children (preschool to age six). Emphasis on instruction that is activity oriented and leads to the development of science process skills, problem-solving strategies, and well-developed conceptual frameworks.

Prerequisite: Admission to the Teacher Education Program.

ED 380. CONTENT AREA READING **Two credits**

The course will present theories and instructional teachniques for teaching reading in the content areas.

Prerequisite: Admission to the Teacher Education Program.

ED 390. INTERN TEACHING **Fifteen credits**

Students are assigned to work with selected classroom teachers. The students assume classroom responsibilities and teach under supervision. Observations and conferences are held on a regular basis with the university supervisors and the cooperating teachers. In addition, students attend weekly three-hour seminars at the University. Fee: $55.

Section A — Secondary (7-12)
Section B — Elementary/Early Childhood
Section C — K-12 Art

ED 395-396. INDEPENDENT RESEARCH **One to three credits**

Independent study and research for advanced students in the field of the major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.

Prerequisite: Approval of department chairperson is required.

ED 397. SEMINAR **(Maximum of three credits per student) One to three credits**

Presentations and discussions of selected topics.

Prerequisite: Approval of department chairperson is required.

ED 198/298/398. TOPICS IN EDUCATION **Variable credit**

A study of topics of special interest not extensively treated in regularly offered courses.

Secondary Methods in Education

Four credits

A study of instructional methodology in Art, Communications, English, Foreign Languages, Mathematics, Sciences, Social Studies. Attention is given to characteristic problems faced by teachers in these several fields. Reading and other specialized techniques are examined. 30 hours practicum.

Ed 300 Foreign Languages (Grades 7-12)
Ed 351 Communication (Grades 7-12)
Ed 352 Art (Grades K-12)
Ed 371 Sciences (Grades 7-12)
Ed 381 Social Studies (Grades 7-12)
Eng 393 English (Grades 7-12)
Mth 303 Mathematics (Grades 7-12)

Prerequisite: Admission to the Teacher Education Program.

ELECTRICAL ENGINEERING

Associate Professor Armand, Chairperson; Professor Emeritus Thomas; Professors Arora, Hostler, Kaska, Nejib; Associate Professors Ahmad, Bush, Choe, Choudhry, Kucirka, Srinivasan; Assistant Professor Gilmer; Adjunct Faculty Osadchy; Technical Support Staff: Lennox, Sickler, Wilk.

Total minimum number of credits required for a major in Electrical Engineering leading to the B.S. degree — 137.

The Electrical and Computer Engineering Department offers both four- and five-year degree programs in Electrical Engineering. These programs provide strong engineering and scientific experience with advanced techniques heavily integrated into the curriculum. Students intending to major in engineering are encouraged to be well prepared in the sciences and mathematics. The first year of course work is common to all engineering programs. An M.S. degree in Electrical Engineering, which is described in a separate graduate Bulletin, is also available.

The four-year program in Electrical Engineering leading to the Bachelor of Science degree offers various specializations. Students can choose to concentrate, within this program, in bioengineering, computer engineering, microelectronics, microwave and antenna systems, or telecommunications. Specialization is achieved through the appropriate selection of the technical electives.

The five-year program in electrical engineering offers the student the opportunity to obtain broader education in the arts and sciences, while completing the requirements for a major in engineering. Upon successful completion of this program, the student is awarded a B.S. degree in electrical engineering. A student may elect to enter this program at any time during his or her period of study. However, because of the sequential nature of the courses in engineering, the timing of this entry is critical.

The student professional chapters of the Institute of Electrical and Electronic Engineers (I.E.E.E.), the Society of Women Engineers (S.W.E.), and the Pennsylvania Society of Professional Engineers (P.S.P.E.), in conjunction with the Department, periodically offer seminars on subjects of a timely nature. Attending these seminars and taking the E.I.T. (Engineer-In-Training) exam are mandatory for the completion of the degree. Students are also highly encouraged to participate in the activities of other on-campus organizations such as the Engineering Club.

ETA KAPPA NU, the International Electrical Engineering Honor Society, established the KAPPA BETA chapter at Wilkes in 1991. The Society recognizes electrical engineering students and professionals who display exemplary academic achievement, character and service. It provides a forum to encourage continued achievement and service among its members, the University and the community.

In 1979 the Technology Transfer Program (TTP) was initiated to enable the community to draw upon the Department's technical expertise and advanced facilities in Northeastern Pennsylvania. This effort is directed to assist in the development and expansion of industries, and the establishment of high technology facilities in Northeastern Pennsylvania.

Honors Programs in Engineering

Upon the recommendation and approval of the engineering faculty, honor students in Engineering will be recognized upon completion of the following requirements: achieving an overall grade point average of 3.25 or better; receiving grades of 3.00 or better in all engineering courses of his or her discipline; pursuing independent research or special projects in engineering; and presenting the results at meetings, conferences, or through publication of a paper. The distinction "Honors in Engineering" will be recorded on the student's transcript upon graduation.

Recommended Course Sequence for a B.S. Degree in Electrical Engineering

First Semester		Second Semester	
Chm 115 Elements and Compounds	4	Chm 118 Chemistry for Engineers	3
Mth 111 Calculus I	4	Mth 112 Calculus II	4
SSE 107 Technological Survival	3	EE 244 FORTRAN	3
ME 180 CADD Lab	1	Phy 201 General Physics I	4
Eng 101 Composition I	3	Eng 102 English Composition II	3
PE 100 Activity	0	PE 100 Activity	0
	15		17
Third Semester		**Fourth Semester**	
EE 211 Circuit Theory I	3	EE 212 Circuit Theory II	3
EE 283 Electrical Measurements Lab	1	Mth 212 Multivariable Calculus	4
Mth 211 Intro. to Differential Equations	4	Phy 203 General Physics III	3
Phy 202 General Physics II	4	ME 232 Strength of Materials	3
ME 231 Statics & Dynamics	3	or 324 Heat and Mass Transfer	
Distribution Requirement	3	MAE 200 Materials Engineering	3
		MAE 284 Engineering Measurements Lab	1
	18		17
Fifth Semester		**Sixth Semester**	
EE 201 Prof. Development & Ethics	1	EE 252 Electronics II	3
EE 214 Linear Systems	3	EE 254 Electronic Lab II	1
EE 251 Electronics I	3	EE 272 Solid State Devices	3
EE 253 Electronic Lab I	1	EE 336 Electromagnetics and Transmission Lines	4
EE 341 Digital Design	3	EE Elective	3
EE Elective	3	Distribution Requirement	3
Distribution Requirement	3		17
	17		

Seventh Semester		Eighth Semester	
EE 321 Electromechanical Energy Conversion	3	EE 323 Machines & Controls Lab	1
EE 337 Waveguides & Antennas	3	EE 382 Comm. & Antenna Lab	4
EE 381 Microelectronics Lab	4	EE 392 Senior Projects II	2
EE 391 Senior Projects I	1	EE Elective	3
EE Elective	3	Distribution Requirements	8
Distribution Requirements	4		18
	18		

EE electives may be chosen from any mathematics, science or engineering course numbered 200 or above, with at least nine credits from three of the following areas: Communications; Computers; Controls; Electronic Materials; Power; Engineering Management (Engineering Management not to exceed 3 credits). Students desiring concentrations should consult their advisor for proper EE electives.

Distribution requirements are selected to satisfy the General Education requirements, and it is required that a two-course sequence be taken in one sub-area of the Heritage & Value requirement. It is strongly recommended that Soc 391 & 392 be taken along with EE 391 & 392.

The required EE 336 and 337 sequence can be satisfied by the combination of Phy 331, 332, 334, and EE 335.

EE 201. PROFESSIONAL DEVELOPMENT AND ETHICS **One credit**

Responsibility of an engineer as a professional, ethics in science and engineering; the role of professional societies; recent trends in technological innovations; career planning. Topics in professional development, registration, and licensure.

Prerequisite: Junior standing in electrical engineering.

EE 211. CIRCUIT THEORY I **Three credits**

Definitions. Formulations of circuit equations and theorems. Various techniques for circuit analysis using resistive networks. Characterizations of inductance and capacitance. Sinusoidal steady-state analysis using phasor concept. Average power and r.m.s. values. Reactive power, complex power, and power factor. Three phase circuits and their analysis. Measurement of power.

Prerequisite: Mth 112.

EE 212. CIRCUIT THEORY II **Three credits**

Laplace transformation. Transient and steady-state analysis using Laplace transformation. Complex frequency and transform impedances. Definitions of one-port and two-port networks. Network functions, poles and zeros. Frequency responses of second order functions. Inter-relationship between time domain and frequency domain quantities. Mutual inductance and ideal transformer. Characterizations of two-port networks. Fourier series and integral. Computer methods in analysis.

Prerequisite: EE 211.

EE 214. LINEAR SYSTEMS **Three credits**

Types of Signals and Systems: Discrete, Continous Deterministic and Stochastic; Application of Laplace and Z Transforms to System Analysis and Design; Fourier and Discrete Transforms and their application to Communications and Digital Signal Processing with strong treatment of sampling, modulation, and aliasing; Modeling of Electrical, Mechanical, Optical Systems and their analysis using State Space Techniques.

Prerequisite: EE 212.

EE 242. MACHINE LANGUAGE **Three credits**

Basic principles of machine language programming. Computer organization and representation of numbers, strings, arrays, list structures at the machine level. Examples utilize all levels of computer architecture. Three hours lecture. Fee: $50. (see CS 230)

Prerequisite: EE 246/CS 126.

EE 244. FORTRAN — **Three credits**

Structured programming, algorithm design, and introduction to programming using FORTRAN 77. The computer is used to solve problems from a variety of fields. Fee: $50. (same as CS 123)

Prerequisite: Secondary mathematics including geometry and algebra II.

Offered every fall, spring and summer.

EE 245. COMPUTER SCIENCE I — **Three credits**

An introduction to the fundamental concepts of computer science, with emphasis on problem solving and algorithm design using the Pascal programming language. Fee: $50. (same as CS 125)

Prerequisite: Secondary mathematics including geometry and algebra II.

Offered every spring and fall.

EE 246. COMPUTER SCIENCE II — **Three credits**

A study of advanced programming techniques (including recursion and manipulation of structured data types and pointer variables) and abstract linear data structures (lists, stacks, and queues). Fee: $50. (same as CS 126)

Prerequisite: CS 125 (EE 245).

Offered every spring and fall.

EE 248. C AND UNIX — **Three credits**

Topics include concepts of time-sharing operating systems, basic UNIX features such as file structures, the shell, the EMACS editor, the electronic mail system, and the File Transfer Protocol (ftp); basic C constructs such as loops, arrays, functions, recursive calls, parameter-passing methods, and pointers; advanced C constructs such as structures, unions, and user defined data types; I/O statements and system calls. (same as CS 226)

Prerequisite: CS 126 or CS 224 or permission of instructor.

Offered every fall.

EE 250. BIOMEDICAL ENGINEERING — **Three credits**

Engineering principles of biomedical instrumentation relating to circulation, respiration, and motor-neural systems are developed. The relationship between human anatomy, physiological system, and transducers is treated as a man-machine interface phenomenon. Instruments emphasized include X-ray, ultrasonics, and coronary care devices.

Prerequisite: Junior or senior standing in engineering or science.

EE 251. ELECTRONICS I — **Three credits**

The development of operating principles and terminal characteristics of electronic devices, particularly semiconductor devices, rectifiers, amplifiers, design considerations for small and large signals.

Prerequisite: EE 212.

EE 252. ELECTRONICS II — **Three credits**

Application of operational amplifiers. Frequency response of amplifiers and principle of feedback. Oscillators, modulation and detection. Design considerations, Logic gates, Flip-Flop Registers and Counters. Principle of digital filters, D/A and A/D converters.

Prerequisite: EE 251.

EE 253. ELECTRONIC LABORATORY I — **One credit**

Familiarization with electronic equipment through experiments. Studying the characteristic of diode and transistor through a series of experiments. Design of power supply and different types of amplifiers. One three-hour laboratory a week. Fee: $50.

Prerequisite: To be taken along with or after EE 251.

EE 254. ELECTRONIC LABORATORY II — **One credit**

Investigating the effect of negative feedback on characteristics of amplifiers. Experiment with operational amplifier and design of electronic circuits using Op-Amps as a building block. Amplifier design using FET. Switching techniques, multivibrators, flip-flop and other major logic circuits. Design of different type oscillators. Modulation and detection. Each lab group is responsible for the design and demonstration of an engineering project. One three-hour laboratory a week. Fee: $50.

Prerequisite: To be taken along with or after EE 252.

EE 271. PHYSICAL ELECTRONICS — **Three credits**

Structure of the solid state, wave mechanics, statistics, band theory of solids, semiconductors and semiconductor electronics. Emission (thermionic, field, and photo-), photoconductivity and luminescene. Diodes, transistors, and other devices. Dielectrics, non-linear optics, piezoelectrics, ferroelectrics, ferro, and ferrimagnetism. Three hours class a week.

Prerequisite: MaE 210, Phy 203.

EE 272. SOLID STATE DEVICES — **Three credits**

Basic properties of semiconductors and their conduction processes, with special emphasis on silicon and gallium arsenide. Physics and characterization of p-n junctions. Homojunction and heterojunction bipolar transistors. Unipolar devices including MOS capacitor and MOSFET. Microwave and Photonic devices.

Prerequisite: Basic concepts of Materials Engineering, Modern Physics, including basic quantum and statistical mechanics.

EE 283. ELECTRICAL MEASUREMENTS LAB — **One credit**

A laboratory for the development of measurement techniques and use of electrical instruments for the measurement of various electrical quantities. Two-hour laboratories per week. Fee: $35.

EE 298. TOPICS IN ELECTRICAL ENGINEERING — **One to three credits**

Selected topics in the field of electrical engineering.

Prerequisite: Sophomore or junior standing or permission of instructor.

EE 314. CONTROL SYSTEMS — **Three credits**

Mathematical modeling of physical systems. Block diagram and signal flow graph representation. Time-domain performance specifications of feedback control systems. Stability analysis; Routh-Hurwitz criterion, Nyquist criterion. Root-locus and frequency response techniques. State space analysis. Design and compensation of feedback systems.

Prerequisite: EE 211 and junior standing.

EE 317. ARTIFICIAL INTELLIGENCE — **Three credits**

This course will provide an overview of artificial intelligence (AI) application areas and hands-on experience with some common AI computational tools. Topics include search, natural language processing, theorem proving, planning, machine learning, robotics, vision, knowledge-based systems (expert systems), and neural networks. (same as CS 340)

Prerequisite: CS 126 or CS 224 or permission of instructor.

Offered in the spring semester of even years.

EE 318. NAVIGATIONAL TECHNIQUES — **Three credits**

Navigation coordinate systems including charts, geodesy and timekeeping, piloting principles of bearings, fixes, and dead reckoning, Celestial navigation principles and vehicle relative coordinates. The attributes of navigation systems such as coverage and accuracy. The use of both classical and modern Navigation systems.

EE 321. ELECTROMECHANICAL ENERGY CONVERSION **Three credits**

Direct energy conversion: Solar, photovoltaic, thermionic and thermoelectric converters, fuel cells, MHD generators. Electromechanical energy conversion: Magnetic circuits, force and torque in magnetic circuits. Principle of operation, construction and application of transformers, DC machines, synchronous and induction machines. Per unit calculations and power system representation.

Prerequisite: EE 211.

EE 323. MACHINES AND CONTROLS LABORATORY **One credit**

No load and load tests on Transformers, DC Machines, Synchronous Machines, and Induction Motors. Three Phase Transformer Connections, Parallel operation of alternators. Control of DC motors and induction motors using SCRs. Fee $45.

Prerequisite: To be taken along with or after EE 321.

EE 335. MICROWAVES AND ANTENNA SYSTEMS **Three credits**

Wave propagation in waveguides, resonant cavities and microwave devices and circuits. Retarded potentials. Relation of radiation fields to source distributions; antenna gain concepts and techniques in antenna design. Characterization and analysis of various types of antennas. Radoms and reflectors. Principles of phased-arrays. Three hours lecture a week.

Prerequisite: EE 332.

EE 336. ELECTROMAGNETICS AND TRANSMISSION LINES **Four credits**

Vector calculus; concepts of flux and fields; electrostatic and magneto static fields; time-varying Maxwell's equations; boundary conditions and boundary value problems; plane wave propagation, reflection and refraction; transmission line, Smith chart, and impedence matching. Three hours lecture and one one-hour simulation lab a week. Fee: $45.

Prerequisites: Mth 212 and Phy 202.

EE 337. WAVEGUIDES AND ANTENNAS **Three credits**

Guided TE and TM waves; cavities and resonant circuits; strip line; S-parameters and microwave devices; directional coupler, attenuator, frequency meter; electromagnetic radiation; dipole antenna; antenna arrays. Two hours lecture and one three-hour laboratory a week. Fee: $15.

Prerequisite: EE 336.

EE 341. DIGITAL DESIGN **Three credits**

Boolean Algebra; Application Specific Integrated Circuit (ASIC) digital logic functions, such as AND, OR, INVERT; digital storage devices; combinational logic; minimization techniques; synchronous and asynchronous design; delay analysis; state machines; ASIC's. Two hours lecture a week and one two-hour of lab a week. Fee: $50. (same as CS 320)

Prerequisite: Junior standing.

EE 342. MICROCOMPUTER OPERATION AND DESIGN **Three credits**

Microprocessor architecture, microcomputer design, and peripheral interfacing. Microprogramming, software systems, and representative applications. Associated laboratory experiments consider topics such as bus structure, programming, data conversion, interfacing, data acquisition, and computer control. Two hours lecture and one two-hour laboratory a week. Fee: $50. (same as CS 329)

Prerequisite: EE 341/CS 320.

EE 343. COMPUTER DATA STRUCTURES **Three credits**

A study of the use of a high-level language to implement complex data structures and their application to sorting and searching. These structures include lists, trees, graphs, networks, and storage allocation. Three hours lecture a week. Fee: $50. (see CS 227)

Prerequisite: EE 246.

EE 344. OPERATING SYSTEM PRINCIPLES **Three credits**

Analysis of the computer operating systems including Batch, Timesharing, and Realtime systems. Topics include sequential and concurrent processes, processor and storage management, resource protection, processor multiplexing, and handling of interrupts from peripheral devices. Three hours lecture a week. (see CS 326)

Prerequisite: EE 343/CS 227.

EE 346. COMPUTER ARCHITECTURE **Three credits**

A study of the design, organization, and architecture of computers, ranging from the microprocessors to the latest "supercomputers." (see CS 330)

Prerequisite: EE 242 or EE 342.

EE 347. COMPUTER NETWORKS **Three credits**

This course introduces basic concepts, architecture, and widely used protocols of computer networks. Topics include the Open System Interconnection (OSI) model consisting of physical link layer, data layer, network layer, transport layer, session layer, presentation layer, and application layer; medium access sublayer and LAN; various routing protocols; Transmission Control Protocol (TCP) and Internet Protocol (IP) for internetworking. (same as CS 355)

Prerequisite: CS 126 or CS 224 or permission of instructor.

Offered in the spring semester of even years.

EE 350. MEDICAL INSTRUMENTATION **Three credits**

Applied medical instruments such as ultrasonic devices and signal processing units for ECG and EEG are discussed. The design principles of electrodes, hemodialysis devices, catheters, clinical instruments, intensive care units (ICU's) and pacemakers are treated. Mechanical and electrical design techniques are developed.

Prerequisite: Junior or senior standing in engineering or science.

EE 360. INDUSTRIAL TRAINING **One to six credits**

Industrial and/or research experience gained through assignments or jobs with the community, government, business, or industry.

Prerequisite: Approval of the Electrical and Computer Engineering Department.

EE 361. COMMUNICATION SYSTEMS **Three credits**

Fundamental properties of signals. Principles and techniques of linear signal processing. Modulation and demodulation systems, including pulse. Sampling, channel capacity, and coding. Methods of multiplexing. Modulator and multiplexer design. Noise and its effects on communication. Three hours lecture a week.

Prerequisite: EE 214.

EE 376. OPTO-ELECTRONIC ENGINEERING **Three credits**

Wave optics, diffraction, and interference. Lasers and applications including modulation and detection. Optical components and devices. Fiber optics and couplers. Communication and system design concepts. Three hours lecture a week.

Prerequisites: EE 272 and EE 336.

EE 381. MICROELECTRONICS LAB **Four credits**

The theoretical and practical aspects of techniques utilized in the fabrication of semi-conductor devices. Crystal growth, solid solubility, alloying and diffusion, oxide masking and epitaxy. Thin and thick film techniques. Device fabrication procedures in microelectronics, and the electrical performance of devices based on these techniques. Ion implantation system and method of fabrication. One hour lecture and one six-hour lab a week. Fee: $50.

Prerequisite: Senior engineering standing.

EE 382. COMMUNICATION AND ANTENNA LAB **Four credits**

Characterization and measurement of microwave components, devices, and systems. Emphasis on testing and design criteria using swept frequency and dynamic techniques. Network and spectrum analyzers. Antenna radiation pattern measurements using the antenna range test facility. Microwave communication link design and testing. CAD utilization in MW systems. Coherent optical wave generation and modulation. Laser communication. One hour lecture and one six-hour laboratory a week. Fee: $50.

Prerequisite: EE 335, or EE 337, or consent of instructor.

EE 391. SENIOR PROJECTS I **One credit**

Design and development of selected projects in the field of electrical engineering under the direction of a staff member. Technical as well as economic factors will be considered in the design. A professional paper and detailed progress report are required.

Prerequisite: Senior standing in engineering.

EE 392. SENIOR PROJECTS II **Two credits**

Design and development of selected projects in the field of electrical engineering under the direction of a staff member. Technical as well as economic factors will be considered in the design. This is a continuation of the EE 391. A professional paper to be presented and discussed in an open forum is required.

Prerequisite: EE 391.

EE 395-396. INDEPENDENT RESEARCH **One to three credits each**

Independent study and research for advanced students in the field of the major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.

Prerequisite: Approval of department chairperson is required.

EE 397. SENIOR SEMINAR **One to three credits**

Presentations and discussions of selected topics.

Prerequisite: Senior engineering standing.

EE 398. TOPICS IN ELECTRICAL ENGINEERING **Three credits**

Selected topics in the field of electrical engineering. These may include one or more of the following: control systems; information theory; signals and noise measurements; communication systems; network design and synthesis; magnetic and non-linear circuits; digital and analog systems; computer systems; medical engineering; power systems and generation. May be repeated for credit. Three hours lecture each week.

Prerequisite: Junior or senior engineering standing.

EE 399. COOPERATIVE EDUCATION **One to six credits**

Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

ENGINEERING MANAGEMENT

Professor Orehotsky, Acting Chairperson; Professor Faut; Associate Professors Ghorieshi, Kalim, Maxwell, Razavi; Assistant Professors Janecek, Mirman; Technical Support Staff: Lennox, Sickler, Wilk.

Total minimum number of credits required for a major in Engineering Management leading to the B.S. degree — 136.

The Department of Mechanical and Materials Engineering offers both four- and five-year degree programs in Engineering Management. These programs provide strong engineering and scientific experience with advanced techniques heavily integrated into the curriculum. Students intending to major in engineering are encouraged to be well prepared in the sciences and mathematics. The first year of course work is common to all engineering programs.

The four-year program in Engineering Management leading to the Bachelor of Science degree offers various specializations. Specialization is achieved through the appropriate selection of the technical electives and involves areas of concentration such as systems engineering. Students in the Engineering Management major must declare a preference area in electrical, environmental, manufacturing, materials, or mechanical. Graduates of this program, with high academic averages, can attain an M.B.A. degree in one year at Wilkes.

The five-year program in engineering management offers the student the opportunity to obtain a broader education in the arts and sciences, while completing the requirements for a major in engineering. Upon successful completion of this program, the student is awarded a B.S. degree in engineering management. A student may elect to enter this program at any time during his or her period of study. The timing of this entry is critical, due to the sequential nature of the courses in engineering.

The student professional chapters of the Society of Women Engineers (S.W.E.) and the Pennsylvania Society of Professional Engineers (P.S.P.E.), in conjunction with the Department, periodically offer seminars on subjects of a timely nature. Attending these seminars and taking the E.I.T. (Engineering-In-Training) exam are mandatory for the completion of the degree. Students are also highly encouraged to participate in the activities of other on-campus organizations such as the Engineering Club.

In 1979 the Technology Transfer Program (TTP) was initiated to enable the community to draw upon the department's technical expertise and advanced facilities in Northeastern Pennsylvania. This effort is directed to assist in the development and expansion of industries, and the establishment of high technology facilities in Northeastern Pennsylvania.

Honors Programs in Engineering

Upon the recommendation and approval of the engineering faculty, honor students in Engineering will be recognized upon completion of the following requirements: achieving an overall grade point average of 3.25 or better; receiving grades of 3.00 or better in all engineering courses of his or her discipline; pursuing independent research or special projects in engineering; and presenting the results at meetings, conferences, or through publication of a paper. The distinction "Honors in Engineering" will be recorded on the student's transcript upon graduation.

Recommended Course Sequence for a B.S. Degree in Engineering Management

First Semester		Second Semester	
Chm 115 Elements and Compounds	4	Chm 118 Chemistry for Engineers	3
Mth 111 Calculus I	4	Mth 112 Calculus II	4
SSE 107 Technological Survival	3	EE 244 FORTRAN	3
ME 180 CADD Lab	1	Phy 201 General Physics I	4
Eng 101 Composition I	3	Eng 102 Composition II	3
PE 100 Activity	0	PE 100 Activity	0
	15		17

Third Semester		Fourth Semester	
EE 211 Circuit Theory I	3	MAE 200 Materials Engineering	3
EE 283 Electrical Measurements Lab	1	MAE 284 Engineering Measurements Lab	1
ME 231 Statics & Dynamics	3	ME 232 Strength of Materials	3
Phy 202 General Physics I	4	or 324 Heat and Mass Transfer	
Mth 211 Intro. to Differential Equations	4	Mth 150 Statistics	3
Ec 101 Economics I	3	Acc 121 Intro. to Financial Accounting	3
		Distribution Requirement	3
	18		16

Fifth Semester		Sixth Semester	
EgM 321 Analysis & Prog. Methods	3	EgM 336 Engineering & Management Models	3
BA 341 Managerial Finance	3	BA 233 Business Law — Legal Environment of Business	3
BA 351 Management of Organizations	3	Technical Electives	6
Technical Electives	6	Distribution Requirements	6
Distribution Requirement	3		18
	18		

Seventh Semester		Eighth Semester	
EgM 201 Prof. Development & Ethics	1	EgM 392 Senior Projects II	2
EgM 391 Senior Projects I	1	GES 240 Principles of Environmental Science	4
BA 321 Marketing	3	Technical Electives	6
Technical Electives	6	Engineering Management Elective	3
Engineering Management Elective	3	Distribution Requirement	2
Distribution Requirements	4		17
	18		

Technical Electives must follow the approved engineering and science courses of the declared concentration in Electrical, Environmental, Manufacturing, Materials or Mechanical. Consult your advisor for advanced preference program outline.

Engineering Management Electives may be satisfied by engineering management courses, independent research, or internship.

Distribution Requirements are selected to satisfy the General Education Requirements. It is strongly recommended that Soc 391 & 392 be taken along with EgM 391 & 392, and it is required that a two-course sequence be taken in one sub-area of the Heritage and Value requirement.

EgM 201. PROFESSIONAL DEVELOPMENT & ETHICS **One credit**

Responsibility of an engineer as a professional, ethics in science and engineering; the role of professional societies; recent trends in technological innovations; career planning. Topics in professional development, registration, and licensure.

Prerequisite: Junior standing in engineering management.

EgM 313. PRODUCTION SYSTEM ANALYSIS **Three credits**

Manufacturing planning and control, material requirement planning, capacity planning, shop-floor control, just-in-time in manufacturing, master production scheduling, production planning, demand management, distribution requirements. Three hours lecture a week.

Prerequisite: Junior/senior standing in engineering.

EgM 318. QUALITY CONTROL ENGINEERING **Three credits**

Quality control in the manufacturing environment; statistical methods used in quality assurance; statistical process control; acceptance sampling prerequisite. Three one-hour lectures per week.

Prerequisite: Mth 150 or consent of instructor.

EgM 320. ENGINEERING PROJECT ANALYSIS **Three credits**

Economic analysis of evaluating cash flows over time. Depreciations: techniques and strategies. Replacement analysis, break even analysis, benefit/cost ratio evaluation. Evaluating a single project-deterministic criteria and techniques. Multiple projects and constraints. Risk analysis and uncertainty. Models of project selections. Project selection using capital asset pricing theory.

Prerequisite: Junior or senior standing in engineering.

EgM 321. QUANTITATIVE ANALYSIS AND PROGRAMMING METHODS **Three credits**

Discussion of various quantitative analysis and optimization methodologies. Analytical/numerical approaches are used in solving linear and nonlinear optimization problems. Emphasizes the development of ability in analyzing problems, solving problems by using software, and post solution analysis.

Prerequisite: Junior standing or consent of instructor.

EgM 332. ENERGY MANAGEMENT ENGINEERING **Three credits**

Appraisal of energy conservation management, economic efficiency of energy sources, productivity analysis techniques. Principles of energy balance analysis and the availability of energy sources.

Prerequisite: Junior or senior study in engineering or science.

EgM 334. MANAGEMENT OF INDUSTRIAL ENGINEERING **Three credits**
Systems analysis that will include all types of problems frequently encountered by industrial engineers, their impact on the management of an industrial concern, and an exposure to the industrial engineering techniques available to solve the problems.
Prerequisite: Senior engineering standing.

EgM 335. PROJECT & SYSTEMS MANAGEMENT **Three credits**
Description of systems management, systems engineering management and the design process. The role of decision theory, modeling, and methodology in systems management analysis. Project environment and control. Program management, planning, and control.
Prerequisite: Senior engineering standing.

EgM 336. ENGINEERING AND MANAGEMENT MODELS **Three credits**
Discussion of the techniques and arts in modeling practical problems encountered by engineers and managers.
Prerequisite: Egr 371 or consent of instructor.

EgM 390. INDUSTRIAL TRAINING **One to six credits**
Industrial and/or research experience gained through assignments or jobs with the community, government, business, or industry.
Prerequisite: Approval of the Mechanical and Materials Engineering Department.

EgM 391. SENIOR PROJECTS I **One credit**
Design and development of selected projects in the various fields of engineering under the direction of a staff member. Technical as well as economic factors will be considered in the design. A professional paper and detailed progress report are required.
Prerequisite: Senior standing in engineering.

EgM 392. SENIOR PROJECTS II **Two credits**
Design and development of selected projects in the field of engineering under the direction of a staff member. Technical as well as economic factors will be considered in the design. This is a continuation of EgM 391. A professional paper to be presented and discussed in an open forum is required.
Prerequisite: EgM 391.

EgM 395-396. INDEPENDENT RESEARCH **One to three credits**
Independent study and research for advanced students in the field of their major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.
Prerequisite: Approval of department chairperson.

EgM 397. SEMINAR **One to three credits**
Presentations and discussions of selected topics and projects.
Prerequisite: Senior engineering standing.

EgM 399. COOPERATIVE EDUCATION **One to six credits**
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)
Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

EgM 198/298/398. TOPICS IN ENGINEERING MANAGEMENT **Variable credit**
Selected topics in the field of engineering and related areas. These may include: mechanical engineering; civil engineering; engineering management; geotechnology; radiation; etc.
Prerequisite: Senior engineering standing.

ENGLISH

Associate Professor P. Heaman, Chairperson; Professors Emeriti Gutin, Lord, Rizzo; Professors Fiester, Kaska, Lennon, Terry; Associate Professor R. Heaman; Assistant Professors Bedford, Fields, Kuhar, Lang; Visiting Assistant Professor Lindgren.

Total minimum number of credits required for a major in English leading to the B.A. degree — 120.
Total minimum number of credits required for a minor — 18 (beyond Eng 101 and 102).

Wilkes University requires 120 credit hours for a B.A. degree in English. These include completion of General Education requirements and 39 credit hours in English including Eng 101 and 102.

The English major offers students an opportunity to develop skills in language, rhetoric, and writing; to practice creative and critical thinking; and to establish a foundation of liberal learning through the study of literature. The skills, values, and habits of thought acquired through the study of language and literature prepare students for careers in teaching, law, communications, journalism, business, government service, and other professional areas. It is strongly recommended that students who major in English take a foreign language.

A second major or a minor in English adds an attractive dimension to a student's major preparation in communications, business, theater, pre-law, and other pre-professional and technical programs in which effective writing, liberal learning, and critical thinking are valued.

Students who major in English may concentrate in literature or writing, or may choose a program leading to certification in elementary or secondary teaching.

Non-majors may be admitted to courses numbered 300 and above with the permission of the instructor and department chair.

Concentrations

Students who concentrate in literature are required to take English 112, 233, 234, and either 281 or 282. In addition, students must complete 21 credit hours in English courses numbered above 300, including one course in a major writer, one course in fiction or drama, two period courses in English literature before 1900, and English 397.

Students who concentrate in writing are required to take English 201 and an additional nine credit hours in other writing courses numbered 200 and above. Students must take English 112 and any three of four survey courses: English 233, 234, 281, and 282. In addition, students must complete nine credit hours in advanced literature courses. Students must also submit a portfolio of written work in the senior year.

It is strongly recommended that students who major in English take a foreign language.

Certification

Students seeking certification as secondary public school teachers of English mush take English 112, and any three of four survey courses: English 233, 234, 281, and 282. In addition, students must complete English 201, 225, 324, 393, 397, and one course in a major figure, one course in fiction or drama, and one course in a literary period or movement. Education courses required are 190, 200, 210, and 390. Students seeking certification as elementary public school teachers should consult carefully with their advisors and the education department in planning their program.

Minor

The minor in English requires fulfillment of General Education requirements in composition and literature and fifteen credits in literature, writing or language-studies courses numbered 200 or above.

Honors

Qualified students may participate in an honors program, which may lead to graduation with distinction in English. Honors students in English will be recognized upon completion of the following requirements:

1. Achievement of a graduating G.P.A. of 3.25 or higher;
2. Achievement of an average of 3.5 in English courses;
3. Completion of a program of independent study resulting in a thesis or writing project recognized as distinguished by a committee of department faculty;
4. Achievement in English studies indicated by performance on standardized assessment examinations.

The distinction "Honors in English" will be recorded on the student's transcript upon graduation.

Recommended Course Sequence for a Major in English

First Semester		Second Semester	
Eng 101 Composition I	3	Eng 102 Composition II	3
Distribution Requirements	12	Distribution Requirements	12
PE 100 Activity	0	PE 100 Activity	0
	15		15

Third Semester		Fourth Semester	
Eng 112 Classical Tradition in Literature	3	Eng 234 Survey of English Literature II	3
Eng 233 Survey of English Literature I	3	Eng 281 American Literature I or	3
Distribution Requirements	9	Eng 282 American Literature II or	
	15	Free Electives	6
		Distribution Requirement	3
			15

Fifth Semester		Sixth Semester	
Major Electives*	6	Major Electives*	9
Free Electives	9	Free Electives	6
	15		15

Seventh Semester		Eighth Semester	
Eng 397	3	Major Elective*	3
Free Electives	12	Free Electives	12
	15		15

*Students select major electives to meet requirements in their area of concentration.

Recommended Course Sequence for a Major in English with Secondary Teacher Certification

First Semester		Second Semester	
Eng 101 Composition I	3	Eng 102 Composition II	3
Distribution Requirements	12	Psy 101 General Psychology	3
PE 100 Activity	0	Distribution Requirements	9
	15	PE 100 Activity	0
			15

Third Semester		Fourth Semester	
Eng 112 Classical Tradition in Literature	3	Eng 201 Advanced Composition	3
Eng 225 Comparative Grammar	3	Eng 234 Survey of English Literature II	3
Eng 233 Survey of English Literature I	3	or Eng 281 American Literature I	
or Eng 281 American Literature I		or Eng 282 American Literature II	
or Eng 282 American Literature II		Free Elective	3
Ed 190 Effective Teaching	3	Ed 200 Educational Psychology	3
Distribution Requirement	3	Distribution Requirement	3
	15		15

Fifth Semester		Sixth Semester	
Eng 234 Survey of English Literature II	3	Eng 324 History of English	3
or Eng 281 American Literature I		Distribution Requirement	3
or Eng 282 American Literature II		Major Electives	6
Eng 393 The Teaching of English	4	Free Elective	3
Major Elective	3		15
Ed 210 Multicultural Education	3		
Distribution Requirement	3		
	16		

Seventh Semester

Eng 397 Seminar	3
Free Electives	12
	15

Eighth Semester

Ed 390A Intern Teaching	15
	15

Recommended Course Sequence for a Major in English with Elementary Teacher Certification

First Semester

Eng 101 Composition I	3
Psy 101 General Psychology	3
Mathematics Elective	3
Science Elective	3
Distribution Requirement	3
PE 100 Activity	0
	15

Second Semester

Eng 102 Composition II	3
Psy 221 Developmental Psychology	3
Mathematics Elective	3
Science Elective	3
Distribution Requirements	6
PE 100 Activity	0
	18

Third Semester

Ed 190 Effective Teaching	3
Ec 101 Principles of Economics I	3
Science Elective	3
Eng 112 Classical Tradition in Literature	3
Eng 233 Survey of English Literature I or Eng 281 American Literature I or Eng 282 American Literature II	3
Hst 207 or 208 American History	3
	18

Fourth Semester

Science Elective	3
Ed 200 Educational Psychology	3
Eng 201 Advanced Composition or Eng 203 Creative Writing	3
Eng 234 Survey of English Literature II or Eng 281 American Literature I or Eng 282 American Literature II	3
GES 261 Regional Geography	3
	15

Fifth Semester

Elementary Ed. Requirements	9
Eng 233 Survey of English Literature I or Eng 281 American Literature I or Eng 282 American Literature II	3
Major Elective	3
	15

Sixth Semester

Elementary Ed. Requirements	6
Major Electives	9
	15

Seventh Semester

Computer Science Elective	3
Major Electives	6
Eng 397 Seminar	3
Elementary Ed. Requirements	6
	18

Eighth Semester

Ed 390B Intern Teaching	15
	15

ENG 098. TUTORIAL IN ENGLISH AS A SECOND LANGUAGE **One to three credits**
Individualized study in using English as a second language. Intensive practice in grammar, syntax, vocabulary, reading and writing.

ENG 099. ENGLISH AS A SECOND LANGUAGE **Three credits**
An introduction to English for non-native speakers.

ENG 101. COMPOSITION I **Three credits**
Principles of exposition; collateral reading; writing of themes.

ENG 102. COMPOSITION II **Three credits**
Principles of exposition continued; introduction to literature; writing of themes; research paper.
Prerequisite: Eng 101.

ENG 110. THEMES IN WORLD LITERATURE **Three credits**
Study of works by western and non-western writers that reflect enduring themes found in literature throughout the world. The literature may emphasize cultural values, intercultural relationships, global perspectives, and variety in aesthetic experiences.
Prerequisite: Eng 102.

ENG 112. THE CLASSICAL TRADITION IN LITERATURE **Three credits**
Study of western world literature to the beginning of the eighteenth century; lectures, quizzes, conferences.
Prerequisite: Eng 102.

ENG 115. THE WESTERN TRADITION IN LITERATURE **Three credits**
Survey of western world literature from the eighteenth century to the present.
Prerequisite: Eng 102.

ENG 118. THE AMERICAN EXPERIENCE IN LITERATURE **Three credits**
A study of selected texts from American literature, emphasizing the multicultural heritage and nature of American writers and their works. Practice in critical reading and writing skills. Designated Writing Intensive.
Prerequisite: Eng 102.

ENG 201. ADVANCED COMPOSITION **Three credits**
A study of rhetorical types and strategies. Reading and intensive practice. Designated Writing Intensive.
Prerequisite: Eng 102.

ENG 202. TECHNICAL AND PROFESSIONAL WRITING **Three credits**
Practice in "real world writing." Students write on subjects associated with their major or intended careers. Students learn to perform as self-aware writers who have something to say to someone, to adapt their roles and voices to various audiences, and to marshal and present persuasively data that is relevant to a particular purpose and context. Designated Writing Intensive.
Prerequisite: Eng 102.

ENG 203. INTRODUCTION TO CREATIVE WRITING **Three credits**
Analysis and practice of various forms of creative writing. Study of the writer's tools and choices in creating poetry, short fiction, and dramatic scenes. Designated Writing Intensive.
Prerequisite: Eng 102.

ENG 222. LINGUISTICS **Three credits**
An introduction to the origins and structure of language and its social functions as related to politics, gender, prejudice, and advertising.
Prerequisite: Eng 102.

ENG 225. COMPARATIVE GRAMMAR **Three credits**
A comparative and critical study of traditional, structural, and transformational-generative grammar.
Prerequisite: Eng 102.

ENG 233. SURVEY OF ENGLISH LITERATURE I **Three credits**
A study of the works and movements in English literature from Anglo-Saxon period through the eighteenth century.
Prerequisite: Eng 102.

ENG 234. SURVEY OF ENGLISH LITERATURE II **Three credits**
A study of the works and movements in English literature from the Romantic movement to the present.
Prerequisite: Eng 102.

ENG 281. AMERICAN LITERATURE I **Three credits**
A study of American literature to the Civil War.
Prerequisite: Eng 102.

ENG 282. AMERICAN LITERATURE II **Three credits**
A study of American literature from the Civil War to the present time.
Prerequisite: Eng 102.

ENG 302. ADVANCED WORKSHOP IN POETRY **Three credits**
An advanced workshop in writing various kinds of poems, ranging from fixed forms of haiku and sonnets to free verse. Designated Writing Intensive.
Prerequisite: Eng 203 or approval of instructor.

ENG 303. ADVANCED WORKSHOP IN FICTION **Three credits**
An advanced workshop in writing fiction, ranging from the short short story to the fully developed character narrative. Designated Writing Intensive.
Prerequisite: Eng 203 or permission of instructor.

ENG 304. ADVANCED WORKSHOP IN PLAYWRITING **Three credits**
An intensive workshop in which students create, analyze, and read original scenes and plays. Designated Writing Intensive.
Prerequisite: Eng 203 or permission of instructor.

ENG 308. RHETORICAL ANALYSIS AND NONFICTIONAL PROSE WRITING **Three credits**
The study and practice of strategies for producing responsibly written public information and persuasion through intensive preparation in argumentation and in supporting propositions for particular audiences. Designated Writing Intensive.
Prerequisite: Eng 201 or permission of instructor.

ENG 324. HISTORY OF THE ENGLISH LANGUAGE **Three credits**
A chronological study of the origins of the English language and the systematic changes that have made it the language we speak and write today.
Prerequisite: Eng 102.

ENG 331. MEDIEVAL ENGLISH LITERATURE **Three credits**
A study of English literature to 1500, exclusive of Chaucer.
Prerequisite: Eng 102.

ENG 332. TUDOR PROSE AND POETRY **Three credits**
Study of English non-dramatic literature from 1485 to 1603.
Prerequisite: Eng 102.

ENG 333. SEVENTEENTH CENTURY PROSE AND POETRY **Three credits**
A study of the non-dramatic literature of the period.
Prerequisite: Eng 102.

ENG 334. THE EIGHTEENTH CENTURY **Three credits**
Study of the major authors and literary traditions of the Eighteenth Century.
Prerequisite: Eng 102.

ENG 335. ROMANTIC PROSE AND POETRY **Three credits**
Study of chief poets and prose writers of the Romantic Period.
Prerequisite: Eng 102.

ENG 336. VICTORIAN PROSE AND POETRY **Three credits**
Readings in the major writers of the Victorian Age.
Prerequisite: Eng 102.

ENG 340. CHAUCER **Three credits**
Study of Chaucer's major works, including *The Canterbury Tales* and *Troilus and Criseyde*.
Prerequisite: Eng 102.

ENG 342. SHAKESPEARE **Three credits**
A study of selected plays; written reports on others not studied in class.
Prerequisite: Eng 102.

ENG 344. MILTON **Three credits**
A study of Milton's poetry and major prose.
Prerequisite: Eng 102.

ENG 350. THE ENGLISH NOVEL **Three credits**
A study of the tradition and major writers of the English novel in the eighteenth and nineteenth centuries. Works by Defoe, Richardson, Fielding, Austen, the Brontes, Dickens, Eliot, and Hardy, among others, as well as critical and theoretical works, may be included.
Prerequisite: Eng 102.

ENG 352. AMERICAN NOVEL **Three credits**
A study of the American novel from its beginning to the present.
Prerequisite: Eng 102.

ENG 355. MODERN NOVEL **Three credits**
Study of the major novels of the twentieth century.
Prerequisite: Eng 102.

ENG 358. CONTEMPORARY FICTION **Three credits**
A study of fiction, including the novel, short story, and novella, written since World War II. Works from English, American, and world literature may be included to reflect the diversity of contemporary literature and the emergence of post-modernist themes and forms.
Prerequisite: Eng 102.

ENG 361. EARLY ENGLISH DRAMA **Three credits**
Study of the drama from the tenth century to 1642; reading of plays by pre-Elizabethan and Elizabethan dramatists exclusive of Shakespeare.
Prerequisite: Eng 102.

ENG 363. RESTORATION & EIGHTEENTH CENTURY DRAMA **Three credits**
Study of the drama from 1600 to 1780.
Prerequisite: Eng 102.

ENG 365. MODERN DRAMA **Three credits**
Study of important dramatists, European and American, from the time of Ibsen.
Prerequisite: Eng 102.

ENG 366. AMERICAN DRAMA **Three credits**
A study of the American drama from the colonial period to the present.
Prerequisite: Eng 102.

ENG 370. MODERN BRITISH POETRY **Three credits**
Study of major British poetry of the twentieth century.
Prerequisite: Eng 102.

ENG 376. MODERN AMERICAN POETRY **Three credits**
Study of major movements and representative figures in modern American poetry.
Prerequisite: Eng 102.

ENG 390. PROJECTS IN WRITING **One to three credits**
Independent projects in writing for advanced students. Designated writing intensive.
Prerequisite: Six credits in advanced writing courses and permission of department chair.

ENG 393. THE TEACHING OF ENGLISH IN SECONDARY SCHOOLS **Four credits**
The course deals with the theory and practice of teaching composition, literature, and English language studies on the secondary school level (grades 7 through 12). Topics include planning, methodology, presentation, and assessment of lessons. The course includes 30 hours of field experience.
Prerequisites: Junior standing in English and admission to the Teacher Education Program.

ENG 394. LITERARY CRITICISM **Three credits**
A study of literary theory and the techniques of analysis.
Prerequisite: Eng 102.

ENG 395-396. INDEPENDENT RESEARCH **One to three credits**
Independent study and research for advanced students in the field of the major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.
Prerequisite: Approval of department chair is required.

ENG 397. SEMINAR **Three credits**
Presentations and discussions of selected topics.
Prerequisite: Approval of department chair is required.

ENG 399. COOPERATIVE EDUCATION **One to six credits**
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)
Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

ENG 198/298/398. TOPICS **Variable credit**
The study of a special topic in language, literature, or criticism. Possible topics include literature and science, Black literature, semiotics, children's literature, literature and film, literature and religion, etc.
Prerequisite: Eng 102.



ENVIRONMENTAL ENGINEERING

Professor Bruns, Chairperson; Professors Cox, Redmond; Associate Professors Case, Halsor, Klemow, Walski; Assistant Professors Barnard, Steele; Visiting Assistant Professor Murthy; Adjunct Faculty Smith, Winsor; Lab Director Oram; Lab Assistant C. Halsor.

Total minimum number of credits required for a major in Environmental Engineering leading to the B.S. degree — 136.

The Department of GeoEnvironmental Sciences and Engineering offers both four- and five-year degree programs in Environmental Engineering. These programs provide strong engineering and scientific experience with advanced techniques heavily integrated into the curriculum. Students intending to major in this program are encouraged to be well prepared in the sciences and mathematics. The first year of course work is common to all engineering programs. Specialization is achieved through the appropriate selection of the technical electives. The department highlights two unique facilities: a certified water quality laboratory used for teaching and contract work, and a 150 acre environmental station (Ratchford Field Station) featuring living quarters scientifically designed for energy conservation. Cooperative internships with industry are encouraged. Students with an Environmental Engineering degree may work for state or federal agencies, industry, or may enter graduate programs in Environmental Engineering.

The five-year program in environmental engineering offers the student the opportunity to obtain broader education in the arts and sciences, while completing the requirements for a major in engineering. Upon successful completion of this program, the student is awarded a B.S. degree in environmental engineering. A student may elect to enter this program at any time during his or her period of study. The timing of this entry is critical, due to the sequential nature of the courses in engineering.

The student professional chapters of the Society of Women Engineers (S.W.E.) and the Pennsylvania Society of Professional Engineers (P.S.P.E.), in conjunction with the Department of GeoEnvironmental Sciences and Engineering, periodically offer seminars on subjects of a timely nature. Attending these seminars and taking the E.I.T. (Engineer-In-Training) exam are mandatory for the completion of the degree.

In 1979 the Technology Transfer Program (TTP) was initiated to enable the community to draw upon the department's technical expertise and advanced facilities. This effort is directed to assist in the development and expansion of industries, and the establishment of high technology facilities in Northeastern Pennsylvania.

Honors Programs in Environmental Engineering

Upon the recommendation and approval of the environmental engineering faculty, honor students in Environmental Engineering will be recognized upon completion of the following requirements: achieving an overall grade point average of 3.25 or better; receiving grades of 3.00 or better in all engineering courses of his or her discipline; pursuing independent research or special projects in engineering and presenting the results at meetings, conferences, or through publication of a paper. The distinction "Honors in Engineering" will be recorded on the student's transcript upon graduation.

Recommended Course Sequence for a B.S. Degree in Environmental Engineering

First Semester		Second Semester	
Chm 115 Elements and Compounds	4	Chm 118 Chemistry for Engineers	3
Mth 111 Calculus I	4	Mth 112 Calculus II	4
SSE 107 Technological Survival	3	EE 244 FORTRAN	3
ME 180 CADD Lab	1	Phy 201 General Physics I	4
Eng 101 Composition I	3	Eng 102 Composition II	3
Distribution Requirement	3	PE 100 Activity	0
PE 100 Activity	0		17
	18		

Third Semester		Fourth Semester	
Mth 211 Intro. to Differential Equations	4	Mth 212 Multivariable Calculus	4
Phy 202 General Physics II	4	GES 240 Principles of Env. Science	4
EE 211 Circuit Theory I	3	MAE 200 Materials Engineering	3
EE 283 Electrical Measurements Lab	1	MAE 284 Engineering Measurements Lab	1
ME 231 Statics & Dynamics	3	ME 232 Strength of Materials	3
Distribution Requirement	3	Distribution Requirement	3
	18		18

Fifth Semester		Sixth Semester	
ENV 305 Hazardous & Solid Waste Management	3	ENV 330 Water Quality	4
ENV 321 Hydrology	3	ENV 332 Air Quality	4
ME 321 Fluid Mechanics	3	EgM 270 Engineering Project Analysis	3
ME 323 Fluid Mechanics Lab	1	ME 324 Heat and Mass Transfer	3
GES 211 Physical Geology	4	Distribution Requirement	3
Distribution Requirement	3		17
	17		

Seventh Semester		Eighth Semester	
ENV 201 Prof. Development & Ethics	1	ENV 322 Water Resources	3
ENV 351 Water and Wastewater Treatment	4	ENV 352 Environmental Engineering Hydraulics	3
ENV 353 Air Pollution Control	3	ENV 392 Senior Projects II	2
ENV 391 Senior Projects I	1	Technical Elective	3
Soc 391 Social Soundness Analysis I	1	Soc 392 Social Analysis	2
Technical Elective	6	Distribution Requirement	3
	16		16

Senior Technical Electives may be any 200 level or higher Science or Engineering course (Bio 113, 121, 122 also will satisfy technical electives). At least one engineering course should be included in the Technical Electives.

Distribution Requirements are selected to satisfy the General Education Requirements. It is required that a two-course sequence be taken in one sub-area of the Heritage and Value requirement.

ENV 201. PROFESSIONAL DEVELOPMENT AND ETHICS **One credit**

Responsibility of an engineer as a professional, ethics in science and engineering; the role of professional societies; recent trends in technological innovations; career planning. Topics in professional development, registration, and licensure.

Prerequisite: Junior standing in environmental engineering.

ENV 305. HAZARDOUS & SOLID WASTE MANAGEMENT **Three credits**

Assessment of the scope of the hazardous and solid waste problem and engineering and management strategies. Lecture topics will include: case histories; groundwater pollution; regulations; human health effect; chemical, biological, thermal, and physical management strategies; and pollution abatement engineering. Three hours lecture.

Prerequisites: Chm 116 or 118 and GES 240.

ENV 315. SOILS **Three credits**

A study of the structure, properties, and classification of soils. Fundamental concepts of soils science are applied to the environmental management of terrestrial ecosystems. Topics include a modern perspective on soil; genesis, classification, and physical properties of soils; organic and inorganic nutrient chemistry; soil moisture relationships; and erosion, sedimentation, and land-use management concepts in selected biomes. Measurements are made both in the field and the laboratory. Two hours lecture and three hours laboratory per week. Fee: $45. Offered every other year.

Prerequisites: Chm 115 and GES 211.

ENV 321. HYDROLOGY **Three credits**

The physical elements and processes which constitute the hydrologic cycle are examined. Topics include floods and flood control, water resources, water uses, and ground water pollution problems. Two hours lecture and two hours laboratory. Fee: $45.

Prerequisite: GES 211.

ENV 322. WATER RESOURCES **Three credits**

Engineering aspects of hydrologic systems including flood control, reservoir systems, open channel design, surface and groundwater development.

Prerequisite: ENV 320.

ENV 330. WATER QUALITY **Four credits**

A study of sources, transport, and effects of aquatic pollutants and disruptions of natural biogeochemical cycles. Lecture topics include distribution of dissolved substances, carbonate and metal equilibria, eutrophication, wastewater engineering, pesticide and oil pollution, radiochemistry of water, thermal water pollution, aquatic toxicology, and groundwater pollution.

Training in instrumentation, analytical techniques, sampling and computer data reduction methods used in monitoring and assessing water and soil pollution. Measurements are made both in the laboratory and the field. Three hours per week of lecture and 3 hours per week of laboratory/design. Fee: $55.

Prerequisites: Chm 115 and 116 (or 118), GES 240.

ENV 332. AIR QUALITY **Four credits**

A study of atmospheric pollutants, their sources and effects. Lecture topics include primary and secondary pollutants, stability and plume behavior, modeling, monitoring, standards, radiation, and air pollution abatement technology and engineering. Analytical procedures, instrumentation and data analysis used in monitoring and assessing air pollution and environmental health. Measurements are performed in the field and the laboratory. Three hours per week of lecture and 3 hours per week of laboratory/design. Fee: $55.

Prerequisites: Chm 115 and 116 (or 118), and GES 240.

ENV 351. WATER AND WASTEWATER TREATMENT **Four credits**

Design of water and wastewater treatment systems. Estimation of demands. Water quality and drinking water regulations. Physical, chemical, biological and land based treatment processes. Sludge disposal. Three hours lecture and three hours laboratory.

Prerequisite: Junior standing in environmental engineering or science.

ENV 352. ENVIRONMENTAL ENGINEERING HYDRAULICS **Three credits**

Water distribution, sewage collection, pipe network models, piping materials, pumps and pumping stations, valves and tanks. Design and operation.

Prerequisite: ME 321.

ENV 353. AIR POLLUTION CONTROL **Three credits**

Methods used for controlling air-borne emissions of gases, aerosols, microorganisms and radiation are covered. Designs are carried out based on data for typical systems. Evaluation of alternatives with cost comparisons are also presented.

Prerequisite: ENV 331.

ENV 360. INDUSTRIAL TRAINING **One to six credits**

Industrial and/or research experience gained through assignments or jobs with the community, government, business, or industry.

Prerequisite: Approval of the GeoEnvironmental Sciences and Engineering Department.

ENV 373. OCCUPATIONAL HEALTH **Three credits**

Appraisal of environmental health hazards, sampling techniques, instrumentation and analytic methods. Principles of substitutions, enclosure and isolation for the control of hazardous operations in industry. Three hours lecture/demonstration.

Prerequisite: Junior or senior standing in engineering or science.

ENV 391. SENIOR PROJECTS I **One credit**

Design and development of selected projects in the various fields of engineering under the direction of a staff member. Technical as well as economic factors will be considered in the design. A professional paper and detailed progress report are required.

Prerequisite: Senior standing in environmental engineering.

ENV 392. SENIOR PROJECTS II **Two credits**

Design and development of selected projects in the field of engineering under the direction of a staff member. Technical as well as economic factors will be considered in the design. This is a continuation of ENV 391. A professional paper to be presented and discussed in an open forum is required.

Prerequisite: ENV 391.

ENV 395-396. INDEPENDENT RESEARCH — **One to three credits**

Independent study and research for advanced students in the field of their major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.

Prerequisite: Approval of department chairperson.

ENV 397. SEMINAR — **One to three credits**

Presentations and discussions of selected topics and projects.

Prerequisite: Senior environmental engineering standing.

ENV 399. COOPERATIVE EDUCATION — **One to six credits**

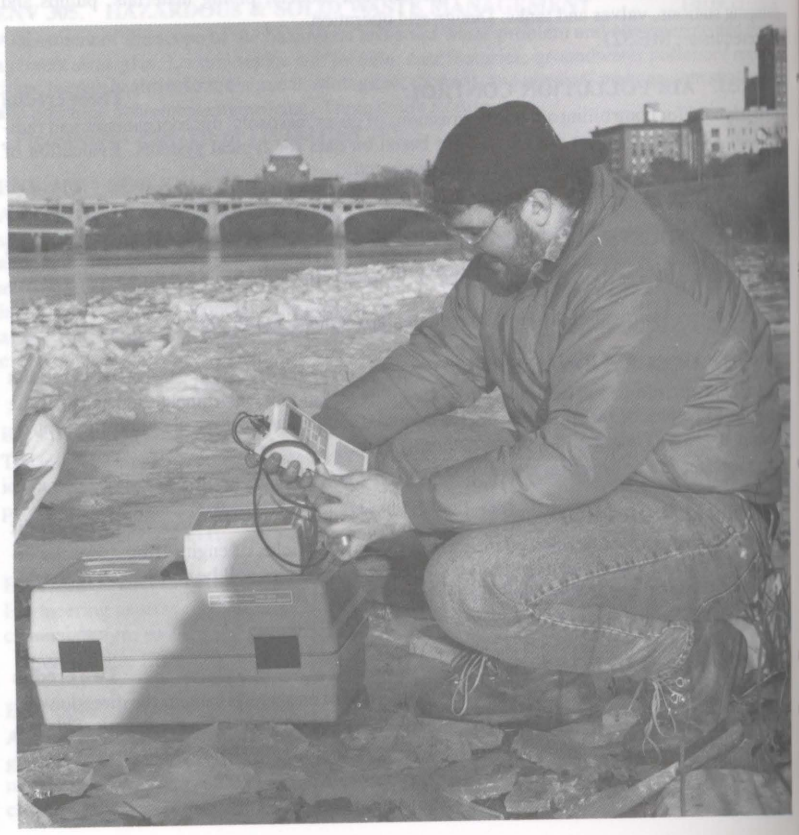
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

ENV 198/298/398. TOPICS IN ENGINEERING — **Variable credit**

Selected topics in the field of engineering and related areas. These may include: mechanical engineering; civil engineering; engineering management; geotechnology; radiation; etc.

Prerequisite: Senior environmental engineering standing.



FOREIGN LANGUAGES AND LITERATURES

Professor W. Karpinich, Chairperson; Assistant Professors Jaén-Andrés, R. Steele.

Total minimum number of credits required for a major in Foreign Language leading to the B.A. degree — 120.

Total minimum number of credits required for a minor — 18.

Study of foreign languages and literatures develops competence in another language, leads to a better understanding of international issues, and cultivates an appreciation of the differences among diverse cultures. Command of a foreign language enables students to advance their foreign language studies at the graduate level, or pursue a broad range of career opportunities in the fields of education, domestic and international commerce, government service, industry, and many others.

Major

French, German, and Spanish are offered as major fields of study. A major in a foreign language consists of twenty-four credit hours in advanced language and literature courses beyond FL 204. Students seeking public school certification in foreign language teaching must take FL 205, 206, 207, 208, 301 (Introduction to Literature), and another literature course in a major writer, or genre, or period, and FL 397. (Please see program description, page 192).

In the interest of broadening career options, all foreign language majors are advised to combine their language studies with another discipline. Students who elect a career in education are advised to study an additional language. All majors are strongly urged to spend at least a semester abroad arranged through the Study Abroad Coordinator.

Minor

Students may elect to minor in French, German, Spanish, or Russian. A minor in foreign language consists of eighteen credit hours beyond FL 102.

In addition, the Department offers two-year study in Japanese, Italian, Latin, Hebrew, Polish, and Ukrainian on a demand basis (see page 198).

Special Program

Foreign language majors may pursue a five-year program of study leading to the Bachelor of Arts and the Master of Business Administration Degrees. During the first four years students complete requirements for the BA, including thirty credit hours in commerce and finance. They devote the summer following their graduation and the fifth year to the MBA.

Information on the above programs and about career opportunities in the field may be obtained from the chairperson of the Department of Foreign Languages and Literatures, Room 201, Kirby Hall.

Recommended Course Sequence for a Major in Foreign Languages (French, German, and Spanish)

First Semester		Second Semester	
FL 101 Elementary I	3	FL 102 Elementary II	3
Eng 101 Composition I	3	Eng 102 Composition II	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15		15
Third Semester		**Fourth Semester**	
FL 203 Intermediate I	3	FL 204 Intermediate II	3
Distribution Requirements	12	FL 205 Conversation	3
		Distribution Requirements	9
	15		15
Fifth Semester*		**Sixth Semester**	
FL 206 Adv. Grammar, Stylistics & Comp.	3	FL 208 Culture and Civilizataion	3
FL 207 Applied Linguistics	3	FL 301 Introduction to Literature	3
Free Electives	9	Free Electives	9
	15		15
Seventh Semester		**Eighth Semester**	
FL 302, or 303, or 304 Literature	3	FL 397 Seminar	3
Fl 298 Topics	3	Free Electives	12
Free Electives	9		
	15		15

*Study Abroad is strongly encouraged and is recommended during the junior year.

Recommended Course Sequence for Teacher Certification in Foreign Languages (French, German, and Spanish)

First Semester		Second Semester	
FL 101 Elementary I	3	FL 102 Elementary II	3
Eng 101 Composition I	3	Eng 102 Composition II	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15		15
Third Semester		**Fourth Semester**	
FL 203 Intermediate I	3	FL 204 Intermediate II	3
Ed 190 Effective Teaching	3	FL 205 Conversation	3
Distribution Requirements	9	Ed 200 Educational Psychology	3
		Distribution Requirements	6
	15		15

Fifth Semester*		Sixth Semester	
FL 206 Adv. Grammar, Stylistics & Comp.	3	FL 208 Culture and Civilization	3
FL 207 Applied Linguistics	3	FL 301 Introduction to Literature	3
Psy 221 Developmental Psychology	3	Ant 102 Cultural Anthropology	3
Free Electives	6	Free Electives	6
	15		15
Seventh Semester		**Eighth Semester**	
FL 302, or 303, or 304 Literature	3	Ed 390A Intern Teaching	15
FL 298 Topics	3		
FL 397 Seminar	3		
Ed 300 Methods in Education	3		
Free Electives	6		
	15		15

Recommended Course Sequence for a Five-Year Program: a B.A. Degree with a Major in Foreign Languages (French, German, and Spanish) and a Master of Business Administration Degree

First Semester		Second Semester	
FL 101 Elementary I	3	FL 102 Elementary II	3
Eng 101 Composition I	3	Eng 102 Composition II	3
CS 115 Computer Science	3	Distribution Requirements	9
Distribution Requirements	6	PE 100 Activity	0
PE 100 Activity	0		
	15		15
Third Semester		**Fourth Semester**	
FL 203 Intermediate I	3	FL 204 Intermediate II	3
Ec 101 Economics I	3	FL 205 Conversation	3
Acc 121 Accounting I	3	Ec 102 Economics II	3
Distribution Requirement	3	Acc 122 Accounting II	3
Free Elective	3	Distribution Requirement	3
	15		15
Fifth Semester*		**Sixth Semester**	
FL 206 Adv. Grammar, Stylistics & Comp.	3	FL 208 Culture and Civilizataion	3
		FL 301 Introduction to Literature	3
FL 207 Applied Linguistics	3	BA/Ec 319 Business Statistics	3
Ec 230 Money and Banking	3	BA 321 Marketing	3
BA 233 Legal Environment of Business	3	Free Elective	3
Free Elective	3		
	15		15

*Study Abroad is strongly encouraged and is recommended during the junior year.

Seventh Semester		Eighth Semester	
FL 298 Topics	3	FL 210 Foreign Language for Business	3
FL 302, or 303, or 304 Literature	3	FL 397 Seminar	3
BA 341 Managerial Finance	3	Free Electives	9
Free Electives	6		
	15		15

Receive B.A. Degree with a Major in Foreign Language at end of eighth semester (120 undergraduate credits).

Summer after Eighth Semester — 6 graduate credits (2 courses)

Ninth and Tenth Semesters — 27 graduate credits (9 courses) to include the following:

Acc 501 Financial and Managerial Accounting	3
BA 502 Management Science	3
BA 507 Business and Society	3
BA 509 Strategic Management and Business Policy	3
Ec 505 Managerial Statistics	3
Ec 510 Managerial Economics	3
MBA Electives	15
	33

Receive M.B.A. Degree at end of tenth semester (33 graduate credits).

FRENCH

FR 101-102. ELEMENTARY FRENCH — **Three credits each**

Fundamentals of spoken and written French, and introduction to French culture. Emphasis will be placed on communicative proficiency. Work in language laboratory required.

FR 203-204. INTERMEDIATE FRENCH — **Three credits each**

Continuation of development of communicative skills in French. Includes review and further study of grammar. Oral and written work based upon short cultural and literary texts. Work in language laboratory required.

Prerequisite: Fr 102 or permission of instructor.

FR 205. CONVERSATION — **Three credits**

Practice in spoken French, including discussions, oral presentations, and role-playing. Includes written exercises.

Prerequisite: Fr 204 or permission of instructor.

FR 206. ADVANCED GRAMMAR, STYLISTICS, AND COMPOSITION — **Three credits**

Practice in written and oral skills with an emphasis on the refinement of grammatical and stylistic abilities.

Prerequisite: Fr 204 or permission of instructor.

FR 207. APPLIED LINGUISTICS — **Three credits**

Theoretical discussions and practical exercises in phonetics, phonemics, syntax, intonation, and rhythm. Intensive speaking and listening practice including work in the language laboratory.

Prerequisite: Fr 204 or permission of instructor.

FR 208. CULTURE AND CIVILIZATION — **Three credits**

Systematic introduction to the political, social, economic, and cultural characteristics of France and the French-speaking world. Readings from a variety of sources including the French press.

Prerequisite: Fr 204 or permission of instructor.

FR 210. FRENCH FOR BUSINESS — **Three credits**

Introduction to language use in the contemporary French business world, including practice in reading, understanding, and writing business communications.

Prerequisite: Fr 204 or permission of instructor.

FR 301. INTRODUCTION TO LITERATURE — **Three credits**

An examination of literary language, genre conventions, and critical approaches, as well as an introduction to French literary history.

Prerequisite: Fr 204 or permission of instructor.

FR 302. THE SHORT STORY AND THE NOVEL — **Three credits**

An introduction to masterpieces of prose fiction from the seventeenth century to the present. May include works by Mme de Lafayette, Voltaire, Flaubert, Zola, Proust, Robbe-Grillet, Yourcenar, and Wittig.

Prerequisite: Fr 204 or permission of instructor.

FR 303. BAUDELAIRE'S LEGACY — **Three credits**

A study of Baudelaire's revolution of poetic convention and its place in the development of French poetry from the nineteenth century to the present.

Prerequisite: Fr 204 or permission of instructor.

FR 304. THE EPOCH OF LOUIS XIV — **Three credits**

An introduction to seventeenth century literature in its historical context, with special emphasis on great plays by Corneille, Racine, and Moliere.

Prerequisite: Fr 204 or permission of instructor.

FR 395-396. INDEPENDENT RESEARCH — **One to three credits each**

Independent study and research in the field of the major under the direction of a staff member.

Prerequisite: Approval of department chairperson.

FR 397. SEMINAR — **(Maximum of three credits per student) One to three credits**

Presentations and discussions of selected topics.

Prerequisite: Approval of department chairperson.

FR 399. COOPERATIVE EDUCATION — **One to six credits**

Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

FR 198/298/398. TOPICS — **Variable credit**

Examination of a special topic in French language, culture, or literature. Possible topics include Medieval literature; Renaissance literature; the Enlightenment; Realism, Naturalism, and Decadence; African literature and Negritude; the literature and language of Quebec; French feminism, French cinema, scientific French; and literature in translation.

GERMAN

GR 101-102. ELEMENTARY GERMAN **Three credits each**
Fundamentals of spoken and written German, and introduction to German culture. Emphasis will be placed on communicative proficiency. Work in language laboratory required.

GR 203-204. INTERMEDIATE GERMAN **Three credits each**
Continuation of development of communicative skills in German. Includes review and further study of grammar. Oral and written work based upon short cultural and literary texts. Work in language laboratory required.
Prerequisite: Gr 102 or permission of instructor.

GR 205. CONVERSATION **Three credits**
Practice in spoken German, including discussions, oral presentation, and role-playing. Includes written exercises.
Prerequisite: Gr 204 or permission of instructor.

GR 206. ADVANCED GRAMMAR, STYLISTICS, AND COMPOSITION **Three credits**
Practice in written and oral skills with an emphasis on the refinement of grammatical and stylistic abilities.
Prerequisite: Gr 204 or permission of instructor.

GR 207. APPLIED LINGUISTICS **Three credits**
Theoretical discussions and practical exercises in phonetics, phonemics, syntax, intonation, and rhythm. Intensive speaking and listening practice including work in the language laboratory.
Prerequisite: Gr 204 or permission of instructor.

GR 208. CULTURE AND CIVILIZATION **Three credits**
Systematic introduction to the political, social, economic, and cultural characteristics of Germany. Readings from a variety of sources including the German press.
Prerequisite: Gr 204 or permission of instructor.

GR 210. GERMAN FOR BUSINESS **Three credits**
Introduction to language use in the contemporary German business world, including practice in reading, understanding, and writing business communications.
Prerequisite: Gr 204 or permission of instructor.

GR 301. INTRODUCTION TO LITERATURE **Three credits**
An examination of literary language, genre conventions, and critical approaches, as well as an introduction to German literary history.
Prerequisite: Gr 204 or permission of instructor.

GR 302. THE NOVELLA **Three credits**
An introduction to the German short story. May include works by Kleist, Eichendorf, Grillparzer, Storm, Mann, Böll and others.
Prerequisite: Gr 204 or permission of instructor.

GR 303. GOETHE **Three credits**
A study of the life and major works of Goethe.
Prerequisite: Gr 204 or permission of instructor.

GR 304. MODERN GERMAN LITERATURE **Three credits**
An introduction to the major movements and writers from Neo-romanticism, Expressionism, and the postwar period. May include works by Hauptmann, Rilke, Mann, Böll, Grass, Lentz, Kaschnitz, and others.
Prerequisite: Gr 204 or permission of instructor.

GR 395-396. INDEPENDENT RESEARCH **One to three credits each**
Independent study and research in the field of the major under the direction of a staff member.
Prerequisite: Approval of department chairperson.

GR 397. SEMINAR **(Maximum of three credits per student) One to three credits**
Presentations and discussions of selected topics.
Prerequisite: Approval of department chairperson.

GR 399. COOPERATIVE EDUCATION **One to six credits**
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)
Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

GR 198/298/398. TOPICS **Variable credit**
Examination of a special topic in German language, culture or literature. Possible topics include translation, the German press, film, the arts, German literature in translation, and literature by women writers.

RUSSIAN AND OTHER LANGUAGES

The Department of Foreign Languages and Literatures offers a two-year program in Russian.

RUS 101-102. ELEMENTARY RUSSIAN **Three credits each**
Fundamentals of spoken and written Russian, and introduction to Russian culture. Emphasis will be placed on communicative proficiency. Work in language laboratory required.

RUS 203-204. INTERMEDIATE RUSSIAN **Three credits each**
Continuation of development of communicative skills in Russian. Includes review and further study of grammar. Oral and written work based upon short cultural and literary texts. Works in language laboratory required.
Prerequisite: Rus 102 or permission of instructor.

RUS 208. RUSSIAN AND EAST EUROPEAN CULTURES **Three credits**
The course is designed to introduce students to the culture and civilization of the Russian people, and to provide them with a better understanding of the Russian influence upon and the relationship with the East European neighbors — Poland, Hungary and others. The course focuses on contemporary cultural, social, and political issues of the region.

RUS 198/298. TOPICS **Three credits**
Investigation of an aspect of the Russian language, literature or culture. Possible topics include translation, the news media, film, the arts, Russian literature in translation, and literature by women writers.
Prerequisite: Permission of instructor.

OTHER LANGUAGES

A two-year program in other languages is offered as demand arises and as circumstances permit. Languages that may be offered, or are presently being offered, include Polish, Ukrainian, Hebrew, Italian, Japanese, and Latin. Interested students should contact the department chairperson.

101-102. **Three credits each**
Designed to develop fundamental skills in the selected language and to introduce students to the culture. Includes systematic coverage of basic grammar supplemented with work in language laboratory where appropriate.

203-204. **Three credits each**
Continued study of grammar and development of proficiency in basic language skills. Exercises based on short cultural and literary texts.
Prerequisite: 102 or permission of instructor.

198/298. STUDIES IN LANGUAGE AND CULTURE **Three credits**
Investigation of an aspect of the selected language and culture. May be repeated for credit.
Prerequisite: Permission of instructor.



SPANISH

SP 101-102. ELEMENTARY SPANISH **Three credits each**
Fundamentals of spoken and written Spanish, and introduction to Spanish culture. Emphasis will be placed on communicative proficiency. Work in language laboratory required.

SP 203-204. INTERMEDIATE SPANISH **Three credits each**
Continuation of development of communicative skills in Spanish. Includes review and further study of grammar. Oral and written work based upon short cultural and literary texts. Work in language laboratory required.
Prerequisite: Sp 102 or permission of instructor.

SP 205. CONVERSATION **Three credits**
Practice in spoken Spanish, including discussions, oral presentation, and role-playing. Includes written exercises.
Prerequisite: Sp 204 or permission of instructor.

SP 206. ADVANCED GRAMMAR, STYLISTICS, AND COMPOSITION **Three credits**
Practice in written and oral skills with an emphasis on the refinement of grammatical and stylistic abilities.
Prerequisite: Sp 204 or permission of instructor.

SP 207. APPLIED LINGUISTICS **Three credits**
Theoretical discussions and practical exercises in phonetics, phonemics, syntax, intonation, and rhythm. Intensive speaking and listening practice including work in the language laboratory.
Prerequisite: Sp 204 or permission of instructor.

SP 208. CULTURE AND CIVILIZATION **Three credits**
Systematic introduction to the political, social, economic, and cultural characteristics of Spain and the Spanish-speaking world. Readings from a variety of sources including the Spanish press.
Prerequisite: Sp 204 or permission of instructor.

SP 209. LATIN AMERICAN CULTURE AND CIVILIZATION **Three credits**
Systematic study of the historical, cultural, economic, and political development of the countries of Latin America (Spanish-speaking countries and Brazil). Pre-Columbian cultures (Maya, Aztec, and Inca) will be examined. Use of audio-visual material and other activities included.
Prerequisite: Sp 204 or permission of instructor.

SP 210. SPANISH FOR BUSINESS **Three credits**
Introduction to language use in the contemporary Spanish business world, including practice in reading, understanding, and writing business communications.
Prerequisite: Sp 204 or permission of instructor.

SP 211. CONVERSATIONAL SPANISH FOR HEALTH AND SOCIAL SERVICES **Three credits**
Designed to provide the students with the basic terminology and conversational skills in Spanish for the health care field, and the social services area. Work on special problems of grammar and idiomatic expression.
Prerequisite: Sp 204 or permission of instructor.

SP 301. INTRODUCTION TO LITERATURE **Three credits**
An examination of literary language, genre conventions, and critical approaches, as well as an introduction to Spanish literary history.
Prerequisite: Sp 204 or permission of instructor.

SP 302. THE NOVEL **Three credits**
An introduction to major novels of the nineteenth and twentieth centuries. May include works by Galdós, Valera, Clarín, *la Generación del ('98)*, and Postwar novelists, as well as *novelas de la democracia*.
Prerequisite: Sp 204 or permission of instructor.

SP 303. CERVANTES **Three credits**
The birth of the modern novel with *Don Quijote*. A study of Cervantes' works and their profound effect on later Spanish literature.
Prerequisite: Sp 204 or permission of instructor.

SP 304. THE GOLDEN AGE **Three credits**
A study of masterpieces of the Baroque period, including the theater of Lope de Yega and Tirso de Molina, the poetry of Góngora and Quevedo, and works by Gracián and Calderón de la Barca.
Prerequisite: Sp 204 or permission of instructor.

SP 305. THE REPRESENTATIVE LATIN AMERICAN NOVEL **Three credits**
A survey of significant Latin American novels with a focus on social, political, intellectual, and cultural development from the colonial period to the present.
Prerequisite: Sp 204 or permission of instructor.

SP 395-396. INDEPENDENT RESEARCH **One to three credits each**
Independent study and research in the field of the major under the direction of a staff member.
Prerequisite: Approval of department chairperson.

SP 397. SEMINAR **(Maximum of three credits per student) One to three credits**
Presentations and discussions of selected topics.
Prerequisite: Approval of department chairperson.

SP 399. COOPERATIVE EDUCATION **One to six credits**
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)
Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

SP 198/298/398. TOPICS **Variable credit**
Examination of a special topic in Spanish language, culture, or literature. Possible topics include literature of exile, the essay in contemporary Spain, pre- and post-Franco theater, literature written by women in the Democracy, peninsular twentieth-century poetry, literature in translation, aspects of bilingualism, problems of Spanish grammar, and history of the Spanish language.

HEALTH SCIENCES

Dr. Ralph B. Rozelle, Dean of Health Sciences.

Adjunct Professors: Sheldon G. Cohen, M.D., Immunology; Frederick B. Rose, M.D., Virology; Joseph A. Scopelliti, M.D., Gastroenterology.

Adjunct Associate Professors: Michael W. Chisdak, M.D., Oncology; Thomas J. McDonald, Jr., M.D., Gastroenterology; Kenneth Levin, M.D., Medical Informatics; Debra A. Ryan, M.D., Internal Medicine; Mary Louise Turgeon, Ph.D., Medical Education.

Health Sciences Committee: Lester J. Turoczi, Ph.D., Chairperson and Professor of Biology; Vijay K. Arora, Ph.D., Professor of Electrical Engineering; Carl J. Charnetski, Ph.D., Professor of Psychology; Michael S. Garr, Ph.D., Associate Professor of Sociology/Anthropology; Terese Guman-Wignot, Ph.D., Assistant Professor of Chemistry; Dan F. Kopen, M.D., Physician and Member of the Wilkes Board of Trustees; Karen A. Mason, Assistant to the Dean for Professional Programs and Enrollment; Roger Maxwell, Ph.D., Associate Professor of Physics/Mechanical Engineering; Mary Ann Saueraker, D.Ed., Associate Professor of Nursing; Michael A. Steele, Ph.D., Assistant Professor of Biology. *Ex Officio:* Ralph Rozelle, Ph.D., Professor of Chemistry and Dean of Health Sciences; Umid R. Nejib, Ph.D., Professor of Electrical Engineering and Dean of the School of Science and Engineering; Emory Guffrovich, Dean of Admissions.

Premedical Programs

Overview

Wilkes University offers premedical studies programs which share a fundamental and formative premise — that unprecedented technological and scientific dynamism will characterize the context of medical careers conducted in the next thirty to fifty years. Such dynamism has important implications for the future physician's baccalaureate studies, including the need to master computer-based information access systems, to reach a level of mastery in the sciences permitting independent judgment and research, and to grow in ethical sensitivity and sophistication. Drawing on the University's strengths in science, information systems, engineering, and the humanities, Wilkes has defined an approach to premedical education which produces exceptionally competent, and competitive, candidates for admission to the nation's leading schools of medicine.

The Wilkes premedical graduate stands out first of all because he or she is not only broadly trained but also has mastered the new and rapidly evolving medical information technologies. Throughout the science curriculum at Wilkes, students are exposed to and use databases which relate fully up-to-date information at the cutting edge of research in science fields. Interviews with medical school professors and admissions officers indicate that such information access skills are increasingly relevant and will soon be essential for the medical practitioner. As a comprehensive university, with a full range of bachelor's and master's degree programs in engineering, computer science, and the natural sciences, Wilkes provides a sophisticated, research-capable science environment, in which students learn how to negotiate the information-rich, but highly complex world of scientific database communications.

The future medical practitioner will also be called upon to assess and implement promising information emerging in the fields of molecular biology, biochemistry, cell biology, and organic chemistry. A general exposure to science at the undergraduate level, typical of liberal arts college premedical studies, will no longer be sufficient to prepare medical students and practitioners to be fully competent as professionals. Wilkes' science-intensive premedical program involves students in research projects and applications activities during their undergraduate years and helps them thereby to gain real mastery as scientists able to make independent judgments and to conceptualize and conduct independent research. The new medicine makes obsolete the former dichotomous categorization of science and preprofessional studies, in that the superior physician will increasingly have to be a research-capable scientist him or herself. Premedical studies at Wilkes have adapted to this trend well in advance of programs at most other institutions.

Databased information and scientific dynamism make more, not less, necessary attention to the moral and ethical dimensions of premedical studies. Through its General Education Requirements, Wilkes provides the future physician with highly meaningful learning experience in philosophy, ethics, and social problems. These Requirements include a special seminar in Heritage and Value, recommended for all premedical students, which examines the foundations of distinct and often contradictory approaches to issues of ethics and social policy. Premedical students are also advised to complete both Introduction to Philosophy and Ethics as parts of their General Education curricula. These learning experiences are augmented by the robust atmosphere of intellectual discussion and debate, which has long been one of Wilkes' distinguishing institutional characteristics, as a non-denominational, non-sectarian university at which issues of morality and ethics are taken seriously. In this way, as in other areas, Wilkes prepares its premedical students for the real world in which they will function as professionals.

The descriptions of courses and curricula, which follow, put into practice what we at Wilkes believe to be a forward-looking program of premedical studies.

Choice of Academic Major, Advisement, and Placement

The premedical curriculum at Wilkes University offers a broad range of choice of academic majors to students. Many major in biology, chemistry, or one of the other traditional science or engineering programs. The newest majors in Medical and Health Physics, Biochemistry, and Applied and Engineering Sciences provide alternative and innovative preparation to students seeking careers in the medical and health fields. Students who have majored in the traditional liberal arts and mathematics have also gained admission to medical school. Medical schools are generally interested in students who have in-depth training in the sciences along with a broad background in the humanities and social sciences.

An important component of the Wilkes premedical education is its counseling and advising system. The Wilkes tradition of close student advising permits thorough understanding of the student's aspirations and goals. A faculty advisor is assigned to the student in his or her major field of choice. In addition, the student is advised of the particulars of medical education by a member of the Health Sciences Committee.

Wilkes enjoys an enviable record of placement of students in medical school, with acceptance rates of over 90%. Allopathic medical schools accepting Wilkes students include Thomas Jefferson University, Hahnemann University, Medical College of Pennsylvania, Pennsylvania State University, Temple University, University of Pennsylvania, and the University of Pittsburgh in Pennsylvania, as well as out-of-state medical schools such as Harvard, Stanford, George Washington, Georgetown, Tulane and Yale. A number of Wilkes students also enter Osteopathic Medical schools, such as the Philadelphia College of Osteopathic Medicine.

The Wilkes Premedical Core

A unique feature of Wilkes' premedical education is the "premed core". This is a sequence of courses which is required of all students aspiring to enter medical schools. This core not only includes the traditional requirements of medical schools but also capitalizes on the University's strengths in the sciences and engineering and addresses new developments in medical schools. Among these requirements is a meaningful research or project experience, a practicum and observation experience provided by local physicians and professionals, knowledge and utilization of computers in medicine, and meaningful laboratory background with emphasis on the understanding and use of modern instrumentation. The Wilkes premed core includes, as a minimum:

2 courses in Modern Biology
(a third course in Comparative Anatomy is recommended)
5 courses in Chemistry including Biochemistry and Organic Chemistry
1 course in Medical Informatics
2 courses in Physics
2 courses in Mathematics (calculus)
1 Research course or a Special Project
1 Internship Experience

Other requirements specified by the academic major chosen are selected in conjunction with the student's academic advisor.

Allopathic Medicine

Students who wish to pursue a career in Allopathic Medicine enroll in a curriculum which will allow them to fulfill the Wilkes Premed Core. A typical allopathic premedical program is outlined. However, students are required to develop with their advisors a detailed program of study which satisfies the major of their choice.

Recommended Course Sequence for Allopathic Medicine

First Semester	
Bio 121 Principles of Modern Biology I	4
Chm 115 Elements and Compounds	4
Eng 101 Composition I	3
Mth 105 Calculus for Life, Managerial, and Social Sciences I **or**	
Mth 111 Calculus I	4
Free Electives	0-2
PE 100 Activity	0
	15-17

Second Semester	
Bio 122 Principles of Modern Biology II	4
Chm 116 The Chemical Reaction	4
Eng 102 Composition II	3
Mth 106 Calculus for Life, Managerial, and Social Sciences II **or**	
Mth 112 Calculus II	4
Free Electives	0-3
PE 100 Activity	0
	15-18

Third Semester	
Bio 221 Cellular and Molecular Biology	4
Chm 231 Organic Chemistry I	4
Psy 101 General Psychology	3
Major Requirements and Free Electives	4-7
	15-18

Fourth Semester	
Chm 232 Organic Chemistry II	4
Major Requirements and Free Electives	11-14
	15-18

Fifth Semester	
Phy 171 Introductory Physics I **or** Phy 201 General Physics I	4
Chm 361 Biochemistry I	3
Major Requirements and Free Electives	9-11
	16-18

Sixth Semester	
Phy 172 Introductory Physics II **or** Phy 202 General Physics II	4
Major Requirements and Free Electives	9-11
Medical Informatics	3
	16-18

Seventh Semester	
Special Project/Research	1
Internship	1
Major Requirements and Electives	15
	17

Eighth Semester	
Special Project/Research	2
Major Requirements and Free Electives	15
	17

Affiliated Degree Programs in Medicine

Wilkes has developed special programs and established transfer agreements with major medical schools which lead to a degree in medicine. Students selected to participate in such a program must satisfy all requirements articulated.

I. The Guthrie Premedical Scholars Program

Hahnemann University School of Medicine in Philadelphia, Pennsylvania, Wilkes University and Guthrie Health Care System, which includes Robert Packer Medical Center in Sayre, Pennsylvania, offer a special premedical Scholars Program for promising high school seniors. The program allows high school seniors to be assured admission to the Hahnemann University School of Medicine before they enter Wilkes University to do their undergraduate work. The program is as follows:

1. Program Format

A. Four (4) years of undergraduate premedical study at Wilkes University.

B. Four (4) years of Medical School study at Hahnemann University School of Medicine.

C. Students in the program will spend the 8th semester of undergraduate premedical study at the Robert Packer Medical Center at Sayre, Pennsylvania, doing clinical and/or basic science research and studying the rural and semi-rural Health Care Delivery System of the lower tier of New York and Northern Pennsylvania.

D. Students in the program will spend parts of the 3rd and 4th year in medical school doing required and elective clinical rotations at Robert Packer.

2. Program Admission

A. Only students with SAT scores of 1100 or above will be considered for admission to the Premedical Scholars Program.

B. Approximately 12 premedical scholars will be admitted to the Program each year.

C. Students admitted to the Program, after interviews at Wilkes, Robert Packer, and Hahnemann, will be simultaneously assured admission to medical school at Hahnemann.

D. Students who have SAT's of 1200 or above will have to maintain a GPA of 3.3 in biology, chemistry, math, and physics during their 1st three (3) years at Wilkes to complete the medical school admission requirements. (No Medical College Admission Test (MCAT) is required.)

E. Students who have SAT's below 1200 have to take the MCAT and score about the 60th percentile in each section in addition to completing part D. The minimal SAT score acceptable for entrance into the program is 1100.

F. Emphasis in recruiting will be placed on students from Pennsylvania and the lower tier of New York plus contiguous regions. Students from other regions are not, however, precluded from entering the program.

Guthrie Premedical Scholars must satisfy the Wilkes Premedical Core and will follow the **Recommended Course Sequence for Allopathic Medicine** outlined above. Students in this program are also required to develop with their advisors a detailed program of study which satisfies the major of their choice. Deadline for application to this program is January 31, 1995.

II. Osteopathic Medicine

Wilkes University and the Philadelphia College of Osteopathic Medicine (PCOM) have instituted a "Seven-Year Doctoral Program in Medicine."

The overall academic program requires students to complete three years in basic sciences and liberal arts education at Wilkes University and four years of medical education at Philadelphia College of Osteopathic Medicine.

Fifteen (15) qualified students per year will be admitted to PCOM at the end of their third year at Wilkes University. Following successful completion of their first year of basic science education in medical school, Wilkes will transfer thirty-six credits in the basic sciences and confer upon each the Bachelor of Science degree.

The program is governed by a Joint Admissions Committee of faculty members from both Wilkes University and PCOM who make recommendations of candidates for admission to medical school to the PCOM Committee on Admissions.

The recommended course sequence for students in the Seven-Year Doctoral Program in Medicine is as follows:

Wilkes University/Philadelphia College of Osteopathic Medicine Undergraduate/Medical School Program

First Semester		Second Semester	
Bio 121 Principles of Modern Biology	4	Bio 122 Principles of Modern Biology II	4
Chm 115 Elements and Compounds	4	Chm 116 The Chemical Reaction	4
Eng 101 Composition I	3	Eng 102 Composition II	3
Mth 105 Calculus for Life, Managerial, and Social Sciences I **or**		Mth 106 Calculus for Life, Managerial, and Social Sciences II **or**	
Mth 111 Calculus I	4	Mth 112 Calculus II	4
PE 100 Activity	0	PE 100 Activity	0
	15		15

Third Semester		Fourth Semester	
Chm 231 Organic Chemistry I	4	Chm 232 Organic Chemistry II	4
Free Electives*	9-10	Free Electives*	9-10
Psy 101 General Psychology	3	Psy Elective	3
	16-17		16-17

Fifth Semester		Sixth Semester	
Phy 171 Introductory Physics I **or**		Phy 172 Introductory Physics II **or**	
Phy 201 General Physics I	4	Phy 202 General Physics II	4
Free Electives*	12-13	Free Electives*	12-13
	16-17		16-17

*Electives include courses to satisfy the broad educational objectives of the Wilkes University General Education Requirements, and the major.

Additional elective credits will be selected from the sciences to extend depth education in disciplines such as Biology and Chemistry. **Chemistry 361, Biochemistry,** is strongly recommended by the Joint Wilkes – PCOM Admissions Committee as an elective.

III. Transfer Medical Degree Program

Four years of undergraduate study ordinarily are required to qualify for the bachelor's degree. Wilkes University makes an exception in special circumstances to this requirement for doctoral students in medicine.

These students may, with the approval of the Academic Standards Committee, satisfy the requirements for the bachelor's degree by completing three years of an academic major, at least the last two of which must be at Wilkes, and by requesting credit toward the degree for their first two years of work in professional school. Students in these programs must, however, satisfy the General Education Requirements at Wilkes University to be considered for a bachelor's degree from the University.

Such students must also petition the Academic Standards Committee for permission to graduate, submit official transcripts from the professional school, and pay the usual graduation fees. In all cases the **final approval for the granting of the degree rests with the Academic Standards Committee of Wilkes University.**

Preprofessional Programs

Predoctoral Programs in Dentistry, Podiatry, Optometry and Veterinary Medicine

Overview

Wilkes University offers preprofessional programs in Dentistry, Podiatric Medicine, Optometry and Veterinary Medicine.

These programs at Wilkes University offer a broad range of choice of academic majors to students. Many major in biology, chemistry or one of the other basic sciences although students have majored in disciplines as diverse as mathematics, engineering and English and have gained admission to professional school. Professional schools are generally interested in students who have depth training in the sciences along with a broad background in the humanities and social sciences.

The preprofessional programs in Dentistry, Podiatric Medicine, Optometry and Veterinary Medicine require a basic core in the sciences as follows:

2 courses in Biology
4 courses in Chemistry (including organic chemistry)
2 courses in Physics
2 courses in Mathematics (calculus)

The program of study in the predoctoral programs follows the semester by semester outline given below. Any predoctoral baccalaureate program of study, however, must include the above basic science prerequisites along with the General Education Requirements, and other specific requirements of the departmental major.

An important component of the Wilkes predoctoral education is its counseling and advising system. The Wilkes tradition of close student advising permits thorough understanding of the student's aspirations and goals. A faculty advisor is assigned to the student in his or her major field of choice. In addition the student is advised on the particulars of doctoral education by a member of the Preprofessional Programs Advisors Council.

Affiliated Programs

In addition to the ordinary four-year, preprofessional undergraduate programs, Wilkes University has developed distinctive affiliated undergraduate-professional school programs with the following:

Temple University School of Dentistry
Pennsylvania College of Podiatric Medicine
Pennsylvania College of Optometry

These three dual-degree medical programs require only three (3) years of study at Wilkes University before entering professional school. Decisions on admission to the professional school are made by action of a joint selection committee of Wilkes University Faculty and Professional School Faculty following three years of study at Wilkes University. Students enrolling in the affiliated programs will generally follow a program of study which is shown below.

Affiliated Predoctoral Programs in Dentistry/Optometry/Podiatric Medicine

First Semester		Second Semester	
Bio 121 Principles of Modern Biology I	4	Bio 122 Principles of Modern Biology II	4
Chm 115 Elements and Compounds	4	Chm 116 The Chemical Reaction	4
Eng 101 Composition I	3	Eng 102 Composition II	3
Mth 105 Calculus for Life, Managerial, and Social Sciences I **or**		Mth 106 Calculus for Life, Managerial, and Social Sciences II **or**	
Mth 111 Calculus I	4	Mth 112 Calculus II	4
Free Electives	0-2	Free Electives	0-3
PE 100 Activity	0	PE 100 Activity	0
	15-17		15-18
Third Semester		**Fourth Semester**	
Chm 231 Organic Chemistry I	4	Chm 232 Organic Chemistry II	4
Psy 101 General Psychology	3	Free Electives	11-14
Free Electives	8-11	Health Profession Orientation	0
	15-18		15-18
Fifth Semester		**Sixth Semester**	
Phy 171 Introductory Physics I **or**		Phy 172 Introductory Physics II **or**	
Phy 201 General Physics I	4	Phy 202 General Physics II	4
Free Electives	12-14	Free Electives	12-14
	16-18		16-18

Total electives available [1, 2] . . . . . .40-56 credits

Following successful completion of the three-year program along with one year of basic sciences education at the professional school, Wilkes University will award the Bachelor of Science degree.

[1]Students in the optometry program must take Mth 150 — statistics.
[2]Must include the General Education Requirements, and the major.

Veterinary Medicine

Students who wish to pursue a career in Veterinary Medicine enroll in a curriculum which will allow them to fulfill the basic science requirements for Veterinary school which are listed below:

2 courses in Biology
4 courses in Chemistry
2 courses in Physics
2 courses in Calculus

Many students elect a biology major which would automatically include the above courses. However, students have the option of choosing other majors depending on their interests.

An academic program for a pre-veterinary medicine student would follow a format similar to the following:

First Semester	
Bio 121 Principles of Modern Biology I	4
Chm 115 Elements and Compounds	4
Eng 101 Composition I	3
Mth 105 Calculus for Life, Managerial, and Social Sciences I **or**	
Mth 111 Calculus I	4
Free Electives*	0-2
PE 100 Activity	0
	15-17

Second Semester	
Bio 122 Principles of Modern Biology II	4
Chm 116 The Chemical Reaction	4
Eng 102 Composition II	3
Mth 106 Calculus for Life, Managerial, and Social Sciences II **or**	
Mth 112 Calculus II	4
Free Electives*	0-3
PE 100 Activity	0
	15-18

Third Semester	
Chm 231 Organic Chemistry I	4
Psy 101 General Psychology	3
Free Electives*	8-11
	15-18

Fourth Semester	
Chm 232 Organic Chemistry II	4
Free Electives*	11-14
Predoctoral Orientation	0
	15-18

Fifth Semester	
Phy 171 Introductory Physics I **or**	
Phy 201 General Physics I	4
Free Electives*	12-14
	16-18

Sixth Semester	
Phy 172 Introductory Physics II **or**	
Phy 202 General Physics II	4
Free Electives*	12-14
	16-18

Seventh Semester	
Major Requirements and Free Electives*	15
	15

Eighth Semester	
Major Requirements and Free Electives*	15
	15

*Must include the General Education Requirements.

Transfer Doctoral Degree Program

Four years of undergraduate study ordinarily are required to qualify for the bachelor's degree. Wilkes University makes an exception in special circumstances to this requirement for doctoral students in Dentistry, Podiatric Medicine, Optometry and Veterinary Medicine.

These students may, with the approval of the Academic Standards Committee, satisfy the requirements for the bachelor's degree by completing three years of an academic major, at least the last two of which must be at Wilkes, and by requesting credit toward the degree for their first two years of work in professional school. Students in these programs must, however, satisfy the General Education Requirements at Wilkes University to be considered for a bachelor's degree from the University.

Such students must also petition the Academic Standards Committee for permission to graduate, submit official transcripts from the professional school, and pay the usual graduation fees. In all cases the **final approval for the granting of the degree rests with the Academic Standards Committee of Wilkes University.**

Allied Health and Pre-Pharmacy Programs

Wilkes students interested in the allied health professions should consult with the Health Sciences Office to explore institutions that offer transfer programs in their chosen field. Prior to selecting courses at Wilkes, students should identify the institution to which they desire to transfer so they can become familiar with admission standards and prerequisites at that institution.

To ease the transfer process, Wilkes does have affiliated programs in the health sciences. These programs are described in the following pages. Students should note that they may transfer to any institution offering their particular program, and not just the institutions with which Wilkes is affiliated.

Overview of Affiliated Programs with Temple University

Temple University College of Allied Health Professions and Wilkes University have established affiliated programs to meet the need for increasing numbers of educated, highly skilled health care professionals. The programs are designed to prepare men and women in their respective fields to participate in comprehensive health care and develop necessary attitudes to become competent professionals.

Affiliated programs are offered in the following areas:

Health Information Management
Occupational Therapy
Physical Therapy

Successful completion of the selected programs, except physical therapy, at the College of Allied Health Professions will lead to the Bachelor of Science degree from Temple University.

The Allied Health Programs, except physical therapy, require four years of study. The first two years of study or the equivalent are done at Wilkes and the final two years at Temple University College of Allied Health Professions. Academic preparation at Wilkes University as well as admission requirements at Temple will differ somewhat for each program.

A brief description of each program and the prerequisite courses which are required for admission to Temple in each program follow. Students should stay in close contact with the Health Sciences Office and their advisor because prerequisite requirements are subject to change.

Health Information Management

Health Information Management is concerned with the development, implementation, maintenance, and administration of systems of storage, retrieval, and release of patient health information.

As a vital member of the health care team frequently unseen by the patient or the family, the Health Information Manager works closely with all other health professionals to gather and make available the information needed by them to provide high-quality patient care. As managers they are responsible for the development and maintenance of a multifaceted medical records system that is capable of providing the data needed:

— by the patient for present and future care and for verification of insurance and other legal claims;

— by the health care professionals as a tool for evaluation of their own performance and as a medium of communication among them;

— by the administration of a facility for analysis and planning;

— by the community for public health;

— by those involved in research and education.

As in all allied health fields, there is an acute shortage of qualified health records managers to fill an increasing number of positions that are available in hospitals, outpatient facilities, research centers, industry, and health agencies throughout the country.

Affiliated Program with Temple University

The program requires the completion of two (2) years at Wilkes and two (2) years at Temple University. Students must complete the departmental requirements and the Temple University core curriculum requirements while at Wilkes:

Bio 115 Human Anatomy and Physiology
Bio 116 Human Anatomy and Physiology
One semester of science (Bio 121 is recommended)
Math 101 and one (1) other Math course (i.e. Mth 100, 105, or 150)
Psy 101 General Psychology
Soc 101 Sociology

American Culture (3 credits)
Composition (3 credits)
International Studies **or**
Foreign Language (6 credits)
Individual and Society (3 credits)
Arts (3 credits)
Intellectual Heritage (6 credits)

Students should consult the Health Sciences Office for a list of Wilkes equivalents to Temple's core requirements.

Occupational Therapy

The services behind the title Occupational Therapy apply to members of the community who encounter difficulties with tasks of living. The difficulties may be from developmental deficits, the aging process, physical illness or injury, economic stress, cultural differences, or psychological problems which present barriers for an individual to function in life.

The Occupational Therapist bases service on a rapidly growing field of knowledge to enhance the individual's abilities to function and prevent areas of dysfunction. The therapist uses selected, goal-directed activities to encourage learning, re-education, growth and strength, and to promote general health.

Occupational Therapists provide services along with other health professionals in a number of different settings ranging from hospitals, clinics, schools, and workshops for homes and community service agencies, to reach a wide population of all ages.

Affiliated Program with Temple University

The program requires the completion of two (2) years at Wilkes and two (2) years at Temple University. Students must complete the departmental requirements and the Temple University core curriculum requirements while at Wilkes. These include:

Bio 115 Human Anatomy and Physiology
Bio 116 Human Anatomy and Physiology
Chm 115 Elements and Compounds
Mth 101 Fundamentals of Mathematics
Psy 101 General Psychology
Psy 215 Research Design and Analysis
Psy 221 Developmental Psychology
Psy 232 Human Behavior
Soc 101 Sociology

American Culture (3 credits)
Composition (3 credits)
International Studies **or**
Foreign Language (6 credits)
Individual and Society (3 credits)
Arts (3 credits)
Intellectual Heritage (6 credits)

Students should consult the Health Sciences Office for a list of Wilkes equivalents to Temple's core requirements.

Physical Therapy

Physical Therapy is a profession concerned with restoration of physical function and the prevention of disability following disease, injury, or loss of body part. The goal of Physical Therapy is to help the patient reach maximum potential and to assume a place in society while learning to live within the limits of his/her capabilities. Various exercises and physical agents according to biomechanical and physiological principles are used to achieve this goal.

Physical Therapists are qualified to utilize such physical agents as therapeutic health, light, electricity, water, exercise, or massage in treating patients. Treatment may consist of teaching the patient an exercise regime to increase muscle power or improve coordination, or teaching the patient to walk with an artificial limb, brace, or other ambulatory aids. Appropriate psychological and sociological principles are applied in motivating and instructing the patient, his/her family, and others. Physical Therapists may delegate selected forms of treatment to supportive personnel with assumption of the responsibilities for the care of the patient and the continuing supervision of the supportive personnel.

Career opportunities exist for physical therapists in hospitals, rehabilitation centers, pediatric facilities, private practice, research, industry, sports medicine, school systems, nursing homes and other health care settings.

Different programs in Physical Therapy have varied prerequisite courses. However, most programs require two courses in biology, two courses in chemistry and two courses in physics as a basic science core. Students can develop a major in a variety of programs which can be worked out with their advisor.

Affiliated Program with Hahnemann University

This affiliated physical therapy program requires four (4) years at Wilkes leading to the Bachelor's Degree and two (2) years at Hahnemann leading to the Master's Degree in Physical Therapy. Early admission to the Hahnemann graduate program is granted to five (5) Wilkes students, who have satisfied all requirements for admission, per year.

Wilkes students applying to Hahnemann must meet the criteria for admission outlined here:

1. A cumulative grade point average at the end of six full semesters of 3.25 or above.
2. Completion of prerequisite science courses, as noted in the curricular outlines, with a cumulative grade point average of 3.25.
3. Minimum Graduate Record Examination (GRE) scores of 550 verbal, 600 quantitative, 600 analytical.

4. Volunteer experience in physical therapy for at least one summer or its equivalent in practicum or work experience.

Students interested in seeking admission to the Hahnemann Program in Physical Therapy should follow a program of study that includes the prerequisite science and math courses along with five courses in the Humanities and Social Sciences (courses that satisfy Areas I and III of the Wilkes distribution requirements will also satisfy this Hahnemann requirement). While students may elect to pursue a variety of majors, programs of study in biology and psychology offer especially sound preparation for a master's in physical therapy. Students should seek the advisement of the Health Sciences Office.

Suggested program outlines for majors in biology and psychology with physical therapy prerequisites follow:

Recommended Course Sequence for a Major in Biology and the Hahnemann Physical Therapy Program

First Semester		Second Semester	
Bio 121 Principles of Modern Biology I*	4	Bio 122 Principles of Modern Biology II*	4
Chm 115 Elements and Compounds*	4	Chm 116 The Chemical Reaction*	4
Eng 101 Composition I	3	Eng 102 Composition II	3
Mth 105 Calculus for Life, Managerial, and Social Sciences I **or** Mth 111 Calculus I	4	Mth 106 Calculus for Life, Managerial, and Social Sciences II **or** Mth 112 Calculus II	4
PE 100 Activity	0	PE 100 Activity	0
	15		15

Third Semester		Fourth Semester	
Bio 225 Population and Evolutionary Biology	4	Bio 226 Cellular and Molecular Biology*	4
Chm 231 Organic Chemistry I	4	Chm 232 Organic Chemistry II	4
Distribution Requirement	3	Distribution Requirement	3
Psy 101 Introduction to Psychology*	3	Psy Elective*	3
	14		14

Fifth Semester		Sixth Semester	
Bio 321 Mammalian Physiology*	4	Bio 397 Seminar	1
Bio Elective/Research	3	Bio Elective/Research	3
Phy 171 Introductory Physics I*	4	Phy 172 Introductory Physics II*	4
Distribution Requirement	3	Distribution Requirements	6
Mth 150 Elementary Statistics*	3	Computer Science Elective	3
	17		17

*Prerequisite for Physical Therapy at Hahnemann University.

Seventh Semester	
Bio 391 Senior Research Projects	1
Bio Elective	3
Distribution Requirements	9
Free Elective**	3
	16

Eighth Semester	
Bio 392 Senior Research Projects	2
Bio Electives	6
Distribution Requirement	3
Free Electives**	6
	17

**Any course other than Biology with three credits reserved for a volunteer experience in Physical Therapy.

Recommended Course Sequence for a Major in Psychology and the Hahnemann Physical Therapy Program

First Semester	
Psy 101 General Psychology*	3
Eng 101 Composition I	3
Bio 121 Principles of Modern Biology I*	4
Chm 115 Elements and Compounds*	4
PE 100 Activity	0
	14

Second Semester	
Major Elective*	3
Eng 102 Composition II	3
Bio 122 Principles of Modern Biology II*	4
Chm 116 The Chemical Reaction*	4
PE 100 Activity	0
	14

Third Semester	
Major Elective **or**	3
Psy 200 Research Design & Analysis**	
Mth 150 Elementary Statistics*	3
Phy 171 Introductory Physics I*	4
Distribution Requirements	6
	16

Fourth Semester	
Major Elective **or**	3
Psy 200 Research Design & Analysis**	
Phy 172 Introductory Physics II*	4
Distribution Requirements	9
	16

Fifth Semester	
Psy 310 Experimental Psychology	3
Major Elective	3
Distribution Requirements	6
Free Elective	3
	15

Sixth Semester	
Major Electives	6
Bio 226 Cellular and Molecular Biology*	4
Free Electives	6
	16

Seventh Semester	
Psy 395 Independent Research	3
Bio 321 Mammaliam Physiology	4
Cooperative Education	3
Free Electives	4
	14

Eighth Semester	
Psy 395 Independent Research	3
Free Electives	12
	15

*Prerequisite for Physical Therapy at Hahnemann University.
**Required.

Affiliated Program with Temple University

This affiliated physical therapy program requires three years of study at Wilkes University and three years of study at Temple University. Students who enter the professional three years of study at Temple will be granted the Bachelor of Arts degree with a major in biology or psychology by Wilkes University following successful completion of their first year at Temple providing that they have met the General Education Requirements. They will be awarded the Master of Physical Therapy degree following completion of three years at Temple. A similar arrangement with other master's programs in Physical Therapy may be made with the permission of the Health Sciences Office.

The affiliated physical therapy program with Temple University requires students to complete fourteen prerequisite courses as part of their three years of study at Wilkes. Candidates also need to complete the Graduate Record Exam (GRE) in the Fall semester of their third year of study. To qualify for admission at Temple, students will need to earn a minimum of a 3.0 GPA while at Wilkes and score above the fiftieth percentile on the GRE. Wilkes students who meet these standards will be given special consideration for admission by Temple.

Students interested in pursuing a Master's in Physical Therapy from Temple should consult with the Health Sciences Office and follow the program outline for either the biology or psychology major.

Recommended Course Sequence for a Major in Biology and the Temple Physical Therapy Program

First Semester	
Bio 121 Principles of Modern Biology I	4
Chm 115 Elements and Compounds	4
Eng 101 Composition I	3
Mth 105 Calculus for Life, Managerial, and Social Sciences I **or**	
Mth 111 Calculus I	4
PE 100 Activity	0
	15

Second Semester	
Bio 122 Principles of Modern Biology II	4
Chm 116 The Chemical Reaction	4
Eng 102 Composition II	3
Mth 106 Calculus for Life, Managerial, and Social Sciences II **or**	
Mth 112 Calculus II	4
PE 100 Activity	0
	15

Third Semester	
Bio 225 Population and Evolutionary Biology	4
Chm 231 Organic Chemistry I	4
Psy 101 Introduction to Psychology	3
Distribution Requirements	4
	15

Fourth Semester	
Bio 226 Cellular and Molecular Biology	4
Chm 232 Organic Chemistry II	4
Psy 221 Developmental Psychology **or** Psy 326 Abnormal Psychology	3
Distribution Requirements	4
	15

Fifth Semester	
Bio 397 Seminar*	1
Bio Elective/Research	3
Phy 171 Introductory Physics I **or**	4
Phy 201 General Physics I	
Soc 101 Introduction to Sociology	3
Distribution Requirement	3
Psy 200 Research Design and Analysis	3
	16-17

Sixth Semester	
Bio 397 Semester*	1
Bio Elective/Research	3
Phy 172 Introductory Physics II **or**	4
Phy 202 General Physics II	
Soc 211 The Family **or**	3
Soc 251 Sociology of Minorities	
Distribution Requirement	3
Major Requirement	3
	16-17

*Only one semester of Bio 397 is required but it must be taken in either the fifth or sixth semester.

Transfer Credits from Temple University — 30.

Recommended Course Sequence for a Major in Psychology and the Temple Physical Therapy Program

First Semester	
Psy 101 General Psychology	3
Bio 121 Principles of Modern Biology I	4
Chm 115 Elements and Compounds	4
Eng 101 Composition I	3
PE 100 Activity	0
	14

Second Semester	
Psy Elective*	3
Bio 122 Principles of Modern Biology II	4
Chm 116 The Chemical Reaction	4
Eng 102 Composition II	3
PE 100 Activity	0
	14

Third Semester	
Psy 200 Research Design and Analysis	3
Mth 100 Precalculus **or**	4
Mth 105 Calculus for Life, Managerial, and Social Sciences I	
Soc 101 Introduction to Sociology	3
Distribution Requirements	6
	16

Fourth Semester	
Psy Elective*	3
Soc 211 The Family **or**	3
Soc 251 Sociology of Minorities	
Distribution Requirements	9
	15

Fifth Semester	
Psy 310 Experimental Psychology	3
Psy Electives*	6
Phy 171 Introductory Physics I	4
Distribution Requirement	3
	16

Sixth Semester	
Psy 326 Abnormal Psychology	3
Psy Electives*	6
Phy 172 Introductory Physics II	4
CS 115 Introduction to Computers	3
	16

*Required Psychology Electives	Psy 221	Developmental Psychology
	Psy 313	Physiological
	Psy 314	Sensory and Perceptual Processes
	Psy 332	Clinical Psychology
	Psy 398	Neuropsychology
	Psy 398	Internship

Transfer Credits from Temple University — 30.

Pre-Pharmacy Program

Students electing to complete two years of study at Wilkes and transfer to a Pharmacy Program at another institution should consult the Health Sciences Office. While prerequisites for Pharmacy Programs vary, generally students need two semesters of biology, four semesters of chemistry, two semesters of calculus, and two semesters of physics. Decisions about elective course work can only be made after consultation with the institution to which the student desires to transfer.

Affiliated Program with Temple University

Wilkes University is affiliated by contract with the Temple University School of Pharmacy. The pharmacy program is a five-year program leading to a degree in pharmacy at Temple University. The first two years are offered at Wilkes and include the course work listed below.

First Semester	
Bio 121 Principles of Modern Biology I	4
Chm 115 Elements and Compounds	4
Eng 101 Composition I	3
Mth 105 Calculus for Life, Managerial, and Social Sciences I **or**	4
Mth 111 Calculus I	
Electives*	3
	18

Second Semester	
Bio 122 Principles of Modern Biology II	4
Chm 116 The Chemical Reaction	4
Mth 106 Calculus for Life, Managerial, and Social Sciences II **or**	4
Mth 112 Calculus II **or**	
Mth 150 Statistics **or**	
Computer Science	
Elective*	3
	15

Third Semester	
Chm 231 Organic Chemistry I	4
Phy 105 Introductory Physics or	4
Phy 201 General Physics I	
Ec 101 Principles of Economics I	3
Electives*	6
	17

Fourth Semester	
Chm 232 Organic Chemistry II	4
Phy 106 Introductory Physics or	4
Phy 202 General Physics II	
Electives*	9
	17

*Electives must be chosen to satisfy Temple University's Core Curriculum, identified here:

American Culture (3 credits)
International Studies **or**
Foreign Language (6 credits)
Individual and Society (3 credits)
Arts (3 credits)
Intellectual Heritage (9 credits)
Writing Intensive (6 courses)

Six credits in Intellectual Heritage should be completed at Wilkes University.

Consult the Health Sciences Office for equivalent Wilkes courses.

Following completion of these two years successfully, students are eligible to be admitted to the final three years of pharmacy school at Temple University. All prerequisite courses listed above, e.g. Bio 121, Chm 115, etc., must be completed with a grade of at least 3.0.

HISTORY

Professor Cox, Chairperson; Professor Emeritus Kaslas; Professors Berlatsky, Breiseth, Rodechko, Shao; Assistant Professors Berg, Hupchick, Meyers; Adjunct Faculty Mortimer, Serine, Williamson.

Total minimum number of credits required for a major in History leading to the B.A. degree — 120.
Total minimum number of credits required for a minor — 18.

Wilkes University requires 120 credit hours for the B.A. degree in history. These include 45 credit hours in distribution courses and 33 credit hours in history. History 101-102, History 207-208, History 391 and 18 credit hours in history courses numbered 300 and above are required. The 300-level courses must include a minimum of six hours each in American and non-American topics. It is recommended that students who major in History take a foreign language, especially those students who plan to continue their studies at the graduate level.

A variety of career options are open to history majors. Since history is a synthesis of the life experience that examines past economic, social, political, scientific, and religious conditions, a careful selection of history courses and elective credit hours will allow students to pursue career interests in business, government, teaching, communications, law, and social service. The history major includes a considerable number of elective credit hours that students may use to develop career interests. The Department also has a 5-year program leading to a B.A. in History and a Masters in Business Administration.

A minor in history shall consist of 18 credit hours in courses offered by the department. These should include the 101-102 sequence and at least one course in American History.

Students majoring in history may receive a Pennsylvania Teaching Certificate for teaching elementary school or social studies in grades 7-12. Please see the requirements listed in the education section of this **Bulletin**.

Recommended Course Sequence for a Major in History

First Semester		Second Semester	
Hst 101 World Civilization I	3	Hst 102 World Civilization II	3
Eng 101 Composition I	3	Eng 102 Composition II	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15		15

Third Semester		Fourth Semester	
Hst 207 American History I	3	Hst 208 American History II	3
Distribution Requirements	12	Distribution Requirements	9
		Free Elective	3
	15		15

Fifth Semester		Sixth Semester	
Major Electives	6	Major Electives*	6
Free Electives	9	Free Electives	9
	15		15

Seventh Semester		Eighth Semester	
Major Elective	3	Hst 391 Historiography & Research*	3
Free Electives	12	Major Elective	3
		Free Electives	9
	15		15

*Hst 391 in the sixth semester for students planning to student teach in the eighth semester.

Recommended Course Sequence for a Major in History (B.A. Degree) and a Master of Business Administration Degree (Five Year Program)

First Semester		Second Semester	
Eng 101 Composition I	3	Eng 102 Composition II	3
Hst 101 World Civilization I	3	Hst 102 World Civilization II	3
Computer Science (any course)	3	Distribution Requirements	9
Distribution Requirements	6	PE 100 Activity	0
PE 100 Activity	0		
	15		15

Third Semester		Fourth Semester	
Hst 207 American History I	3	Hst 208 American History II	3
Acc 121 Financial Accounting	3	Acc 122 Managerial Accounting	3
Ec 101 Economics I	3	Ec 102 Economics II	3
Distribution Requirement	3	Distribution Requirement	3
Free Elective*	3	Free Elective*	3
	15		15

Fifth Semester		Sixth Semester	
Major Electives	6	Major Electives	6
Ec 230 Money and Banking	3	BA 321 Marketing	3
BA 233 Legal Environment of Business	3	BA/Ec 319 Business Statistics	3
Free Elective*	3	Free Elective*	3
	15		15

*Sufficient elective credits are available to allow students to complete a minor in most fields offering a minor. See Wilkes undergraduate **Bulletin** for minor requirements.

Seventh Semester		Eighth Semester	
Major Electives	6	Hst 391 Historiography and Research	3
BA 341 Managerial Finance	3	Free Electives*	12
Free Electives*	6		
	15		15

*Sufficient elective credits are available to allow students to complete a minor in most fields offering a minor. See Wilkes undergraduate **Bulletin** for minor requirements.

Receive B.A. Degree with a Major in History at end of eighth semester (120 undergraduate credits).

Summer after Eighth Semester — 6 credits

Acc 501 Financial and Managerial Accounting	3
BA 502 Management Science	3
	6

Ninth and Tenth Semesters — 27 credits

BA 507 Business and Society	3
BA 509 Strategic Management and Business Policy	3
Ec 505 Managerial Statistics	3
Ec 510 Managerial Economics	3
MBA Elective	15
	27

Receive M.B.A. Degree at end of tenth semester (33 graduate credits).

HST 101-102. WORLD CIVILIZATION — **Three credits each**
This course is designed as a survey of all the basic cultures of the world. The major portion of the course will be devoted to the development of western civilization. Attention will also be given to the part played by America in world history, especially during the expansion of Europe and in the twentieth century.

HST 105. HUMANS AND MACHINES: TECHNOLOGY AND HISTORY — **Three credits**
An examination of technological changes and the manner in which they have affected the modern world, particularly the contemporary United States. Topics considered include society, environment, communications media and transportation, the city, the home, and the changing role of women in a mature industrial society.

HST 207-208. AMERICAN HISTORY — **Three credits each**
A general survey of American history from colonial times to the present.

HST 315. READINGS IN ANCIENT HISTORY: THE NEAR EAST — **Three credits**
Selected readings on the history of the Ancient Near East, with emphasis on primary sources. Conferences with instructor and paper.

HST 316. READINGS IN ANCIENT HISTORY: THE CLASSICAL WORLD — **Three credits**
Selected readings on the history of Greece and Rome, with emphasis on primary sources. Conferences with instructor and paper.

HST 321. AMERICAN SOCIAL HISTORY — **Three credits**
This course entails a consideration of the development of American society from the colonial period until present time. Attention will especially focus on the rise of industrialism and its impact on society in the late nineteenth and twentieth centuries.

HST 322. AMERICAN INTELLECTUAL HISTORY — **Three credits**
This course is a survey of the formative ideas which seem most to have influenced American perceptions of the individual, society, and the drift of human affairs. The focus is upon the late nineteenth and early twentieth centuries because this period is the time when seminal ideas were articulated in America.

HST 324. AMERICAN ECONOMIC HISTORY — **Three credits**
A survey of the evolution of the American economy from colonial dependency to modern industrial maturity. Emphasis will be placed upon the development of the United States as an industrial world power since about 1850.

HST 325. AMERICAN ETHNIC HISTORY — **Three credits**
A study of the institutions and problems that have characterized various immigrant, black, and Indian communities from colonial times to the present.

HST 328. HISTORY OF THE FOREIGN POLICY OF THE UNITED STATES — **Three credits**
A selective treatment of major themes in American foreign policy from the founding of the Republic to the present.

HST 331. COLONIAL AMERICA — **Three credits**
Discovery, exploration, and settlement; development of social, political, religious, and intellectual institutions; independence and political reorganization.

HST 332. THE NATIONAL PERIOD — **Three credits**
A study of the political and economic history of the United States from 1783 to 1865. Special attention will be given to the evolution of sectional differences and the culmination of these differences in intersectional warfare.

HST 333. THE AGE OF BIG BUSINESS, 1865-1914 — **Three credits**
A study of the political and economic history of the United States from 1865 to 1914. Special attention will be paid to the period of congressional dominance and the restoration of presidential power at the turn of the century; the economic, social, and political consequences of the industrial revolution; and the rise of urban America.

HST 334. THE UNITED STATES, 1900-1945 — **Three credits**
The emergence of the United States as a world power and the corresponding development of its political, economic, social, and religious institutions.

HST 335. THE UNITED STATES SINCE 1945 — **Three credits**
An examination of the political, social, and economic changes in the United States since World War II. Special attention is paid to America's dominant role in the immediate post-war world and how changing conditions over the past forty years have altered this role.

HST 341-342. HISTORY OF GREAT BRITAIN AND THE BRITISH EMPIRE AND COMMONWEALTH — **Three credits each**
A study of British history from the Neolithic period to present times. The first semester will cover social, economic, and political developments to 1783, including expansion overseas. The second semester will cover the consequences of the industrial revolution and the evolution of the Empire into the Commonwealth.

HST 345. EASTERN EUROPE I **Three credits**
A study of the cultural, political and intellectual history of the Poles, Czechs, Slovaks, Croats, Slovenes and Hungarians, who occupy the northern tier of Eastern Europe. Special attention is given to the roles of the Habsburg and Russian empires in shaping the historical destinies of these peoples, and to the roots and consequences of the forces of nationalism in the region.
Prerequisite: Hst 101-102.

HST 346. EASTERN EUROPE II **Three credits**
A study of the cultural, political and intellectual history of the Bulgarians, Serbs, Croats, Slovenes, Albanians, Greeks, Romanians and Turks, who occupy the southern, or Balkan, tier of Eastern Europe. Special attention is given to the roles of the Ottoman Turkish, Habsburg and Russian empires in shaping the historical destinies of these peoples, and to the roots and consequences in the region of such forces as Christian-Muslim cultural interrelationships and nationalism.
Prerequisite: Hst 101-102.

HST 348. HISTORY OF RUSSIA **Three credits**
A study of the political, social, and intellectual history of Russia. Emphasis is placed upon the emergence of Russia as a major power after 1700.

HST 351. READINGS IN MEDIEVAL EUROPE **Three credits**
Selected readings on the history of Medieval Europe, with emphasis on primary sources. Conferences with instructor and paper.

HST 352. THE RENAISSANCE AND REFORMATION **Three credits**
Within the political and economic framework of the period, study will be made of the culture of the Renaissance, the religious reforms and conflicts resulting from the crisis in the sixteenth century.

HST 353. AGE OF ABSOLUTISM **Three credits**
The political, social, economic, intellectual, and cultural development of Europe and dependencies from 1600 to about 1750.

HST 354. THE ERA OF THE FRENCH REVOLUTION AND NAPOLEON **Three credits**
A study of the structure of the Ancien Regime and an examination of the causes, events, and consequences of the French Revolution culminating in the Napoleonic Empire.

HST 355. EUROPE IN THE NINETEENTH CENTURY **Three credits**
A study of the political, social, and cultural development of Europe from the Congress of Vienna to World War I.

HST 356. EUROPE IN THE TWENTIETH CENTURY **Three credits**
Against a background of the internal and international developments of the leading powers, students will study the origins and results of the two World Wars.

HST 361-362. HISTORY OF THE FAR EAST **Three credits each**
A study of the history of the civilizations developed in India, China, and Japan with emphasis on their interrelations and distinctive characteristics and on their transformation in response to the penetration of western civilization from the sixteenth century onward. Some attention will be given to similar developments and changes among the countries of Southeast Asia. Fall semester: to c. 1760. Spring semester: 1760 to present.

HST 363. HISTORY OF MODERN CHINA **Three credits**
A study of Chinese history since 1840 with special emphasis on social, political, economic, and intellectual developments.

HST 364. DIPLOMATIC HISTORY OF THE FAR EAST **Three credits**
A study of the relationship of the states of the Far East with one another and the West in the nineteenth and twentieth centuries.

HST 365. HISTORY OF CHINESE COMMUNISM **Three credits**
This course is designed to examine the origins of Chinese Communism, the rise of the Chinese Communist Party to national power, and the essential features of Mao Tse-Tung's strategies and policies.

HST 367. HISTORY OF MODERN INDIA **Three credits**
A study of the political, social, and economic development of the Indian sub-continent since 1500.

HST 376. WORLD WAR II **Three credits**
Consideration of the causes of the war, military strategy and tactics, diplomatic interests of the participants, and resulting cold war problems.

HST 391. HISTORIOGRAPHY AND RESEARCH **Three credits**
An introduction to historical research and writing. The writings and ideas of major historians of the past and present are examined. The student is exposed to research methods, particularly in the area of primary sources, and to the construction and criticism of the historical monograph.
Prerequisite: Approval of instructor.

HST 395-396. INDEPENDENT RESEARCH **One to three credits**
Independent study and research for advanced students in the field of the major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.
Prerequisite: Approval of department chairperson.

HST 397. SEMINAR **(Maximum of three credits per student) One to three credits**
Presentations and discussions of selected topics.
Prerequisite: Approval of instructor is required.

HST 399. COOPERATIVE EDUCATION **One to six credits**
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)
Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

HST 198/298/398. TOPICS **Variable credit**
Special topics in history. This course will be offered from time to time when interest and demand justify it.

INDIVIDUALIZED STUDIES

This program is designed for those capable and motivated students who wish to undertake a course of study that cannot be provided for under any of the normal B.A., B.S. degree programs. The student will be responsible for generating a coherent proposal for a program of studies. This proposal must be selected by the student, approved by an advisor, and then by the Individualized Studies Committee. The program of studies may include courses offered by all departments at Wilkes University. In addition, credit may be assigned for appropriate off-campus study, work, and/or travel. Credits may be granted for knowledge or experience obtained prior to enrollment, with approval of the appropriate department and the Individualized Studies Committee.

Degree Requirements

The basic requirement for the degree in Individualized Studies is the accumulation of 120 credits. Although there are no specific course requirements, the spirit of the Wilkes University General Education Requirements is to be respected.

INDUSTRIAL ENGINEERING

Professor Orehotsky, Acting Chairperson; Professor Faut; Associate Professors Ghorieshi, Kalim, Maxwell, Razavi; Assistant Professors Janecek, Mirman; Technical Support Staff: Lennox, Sickler, Wilk.

The two-year program in Industrial Engineering is offered by the Department of Mechanical and Materials Engineering. This program is specifically designed to provide a successful transfer of students to the junior year at other accredited engineering schools.

Recommended Course Sequence for Industrial Engineering

First Semester		Second Semester	
Chm 115 Elements and Compounds	4	Chm 118 Chemistry for Engineers	3
Mth 111 Calculus I	4	Mth 112 Calculus II	4
SSE 107 Technological Survival	3	EE 244 FORTRAN	3
ME 180 CADD Lab	1	Phy 201 General Physics I	4
Eng 101 Composition I	3	Eng 102 Composition II	3
PE 100 Activity	0	PE 100 Activity	0
	15		17

Third Semester		Fourth Semester	
Mth 211 Intro. to Differential Equations	4	Mth 212 Multivariable Calculus	4
EE 211 Circuit Theory I	3	MAE 200 Materials Engineering	3
EE 283 Electrical Measurements Lab	1	MAE 284 Engineering Measurements Lab	1
ME 231 Statics & Dynamics	3	BA 352 Production & Operations Man.	3
Phy 202 General Physics II	4	or Distribution Requirement	
Distribution Requirement	3	ME 232 Strength of Materials	3
	18	or 324 Heat and Mass Transfer	
		Distribution Requirement	3
			17

INTERNATIONAL STUDIES

Associate Professor Merryman, International Studies Advisor.

Total minimum number of credits required for a major in International Studies leading to the B.A. degree — 120.

The interdisciplinary major in International Studies (I.S.) provides an excellent liberal arts preparation for a variety of careers and professions. The major is structured to permit concentration in fields leading to specific careers in business, government, international organizations, the military, teaching, or any technical or arts field. It is also structured to permit a period of study abroad with easy transfer of credits to the major.

The total number of hours required for graduation with an International Studies major is 120, of which 45 are the General Education requirements and 33 are major requirements. For the International Studies major, the following courses at the introductory level are required, some of which can be counted in the Distribution of Studies requirements: History 101-102; Economics 101-102; Political Science 141; Anthropology 101; and Foreign Language at 204 competence. Students are also required to take 6 hours of advanced Foreign Language beyond the 204 level. In addition, students must complete 2 courses from among Anthropology 102, Political Science 251, and Economics 301, plus either Economics 310 or 340.

Before completing the International Studies major requirements, students should select the **area of concentration** in which 12 more credits are required. Options for this concentration are one of several culture areas (Asia, East European and Russian Studies, Third World, or Western Europe), or International Economics, or International Politics, or Language. Specific courses contributing to one of these concentrations and the I.S. requirements will be worked out with the International Studies Advisor and may include courses taken while studying abroad at another institution. Major electives in the areas of concentration are listed below.

Culture Areas:

Asia
- Anthropology 102, 213, 321, and/or 352
- Economics 301, 310, 312, and/or 340
- History 361, 362, 363, 364, 365, and/or 367
- Political Science 253, 342

East European and Russian Studies
- Four courses (12 credits) from those listed under the East European and Russian Studies minor on page 150

Third World
- Anthropology 102, 213, 214, 352, 321, and/or 353
- Economics 310, 312, and/or 340
- History 363, 365, 367
- Political Science 253, 342
- Spanish 209 and/or 305

Western Europe
- Economics 301, 310, and/or 311
- French 208, 298, and/or 302, 303, or 304
- German 208, 298, and/or 302, 303, or 304
- History 342, 356, and/or 376
- Political Science 251, 342, 351
- Spanish 208, 298, and/or 302, 303, 304, or 305

(**NOTE:** No more than six hours may be taken in any one discipline listed under individual area concentrations.)

International Economics:
- Economics 301, 310, 311, 312, and/or 340

International Politics:
- History 328, 348, 364, and/or 376
- Political Science 251, 253, 342, and/or 351

(**NOTE:** No more than 6 hours in History may be taken in this concentration.)

Modern Foreign Language:
- 12 hours of advanced foreign language courses beyond International Studies core

Except in unusual circumstances, it is expected that International Studies majors will spend a summer, semester, or year abroad in a suitable program of academic study arranged through the Wilkes Study Abroad Program Coordinator. Credits earned abroad may be applied towards satisfying International Studies major requirements.

Students in the International Studies major have 35-39 credit hours of free electives. Students are urged to take additional language credits to constitute a language minor or major. It is also possible to use electives to constitute a second major in a discipline such as Economics, History, or Political Science.

Advising for the International Studies major is done in the Anthropology Department.

Recommended Course Sequence for International Studies Major

First Semester		Second Semester	
Eng 101 Composition I	3	Eng 102 Composition II	3
Hst 101 World Civilization I	3	Hst 102 World Civilization II	3
Ec 101 Principles of Economics I	3	Ec 102 Principles of Economics II	3
Ant 101 Intro. to Anthropology	3	PS 141 Introduction to International Politics	3
Foreign Language*	3	Foreign Language*	3
PE 100 Activity	0	PE 100 Activity	0
	15		15
Third Semester		**Fourth Semester**	
Ant 102 Cultural Anthropology and/or Ec 301 Comparative Economic Systems*	6	Ec 310 Economic Development and/or Ec 340 International Trade	3
Foreign Language*	3	Foreign Language*	3
Distribution Requirements	6	Distribution Requirements	6
	15	Major Elective	3
			15
Fifth Semester		**Sixth Semester**	
		Study Abroad**	
	15		15
Seventh Semester		**Eighth Semester**	
Foreign Language	3	Foreign Language	3
Major Electives	6	Major Elective	3
Distribution Requirements	6	Distribution Requirement	3
	15	Free Elective	3
		Senior Seminar*	3
			15

*These courses are required for all International Studies Majors.

**Students may elect to spend their junior year on campus. Courses will be selected in consultation with the International Studies Advisor.

MATERIALS ENGINEERING

Professor Orehotsky, Acting Chairperson; Professor Faut; Associate Professors Ghorieshi, Kalim, Maxwell, Price, Razavi; Assistant Professors Janecek, Mirman; Technical Support Staff: Lennox, Sickler, Wilk.

Total minimum number of credits required for a major in Materials Engineering leading to the B.S. degree — 134.

Mission Statement

The Engineering Department at Wilkes and its Materials Engineering Program were instituted initially to serve the particular educational, economic, and industrial needs of a surrounding region and its population attempting to emerge from the demise of the coal-mining industry. Within this context, the program is visionally committed to more than simply providing a quality education to its students. This vision also includes a supportive role for assisting, revitalizing and expanding the technical and industrial activity in the region.

To fully achieve a quality materials engineering education, the program involves small-sized classes and direct faculty contacts in the classroom and particularly in the laboratory for the entire materials engineering undergraduate experience. The program is course and curriculum structured to emphasize the interrelationship between structure and processing as these items are related to the properties of polymeric, metallic, ceramic, and composite materials. Appropriate hands-on experimental laboratory projects with the faculty is emphasized. Another important and highly emphasized aspect of the program as a means of proper student training is an intensive design component over the entire program with increasing complexity and broadening diversity from the introductory to the advanced level courses, culminating in a unifying capstone senior-year design course. This aspect is an important extension of a program philosophy that encourages joint project activity among students, faculty and regional industry particularly in the design component as a means of both preparing students for the real industrial world and supporting local industry. In particular, a component part of the capstone design course is associated with business concerns of an engineering enterprise, from entrepreneurial and start-up to manufacturing and marketing activities. Ultimately, the program is structured to broaden students' field of vision without narrowing the scope of their training such that they will be provided with the best possible education for use on a regional, national and global scale while supporting and expanding the industrial base of a regional economy.

Program

The Department of Mechanical and Materials Engineering offers both four- and five-year degree programs in Materials Engineering. These programs provide strong engineering and scientific experience with advanced techniques heavily integrated into the curriculum. Students intending to major in engineering are encouraged to be well prepared in the sciences and mathematics. The first year of course work is common to all engineering programs.

The four-year program in Materials Engineering leading to the Bachelor of Science degree offers various specializations. Specialization is achieved through the appropriate selection of the technical electives and involves areas of concentration such as electronic materials.

The five-year program in materials engineering offers the student the opportunity to obtain a broader education in the arts and sciences, while completing the requirements for a major in engineering. Upon successful completion of this program, the student is awarded a B.S. degree in materials engineering. A student may elect to enter this program at any time during his or her period of study. The timing of this entry is critical, due to the sequential nature of the courses in engineering.

The student professional chapters of the Materials Research Society (M.R.S.), the Society of Women Engineers (S.W.E.), and the Pennsylvania Society of Professional Engineers (P.S.P.E.), in conjunction with the Department, periodically offer seminars on subjects of a timely nature. Attending these seminars and taking the E.I.T. (Engineering-In-Training) exam are mandatory for the completion of the degree. Students are also highly encouraged to participate in the activities of other on-campus organizations such as the Engineering Club.

In 1979 the Technology Transfer Program (TTP) was initiated to enable the community to draw upon the department's technical expertise and advanced facilities in Northeastern Pennsylvania. This effort is directed to assist in the development and expansion of industries, and the establishment of high technology facilities in Northeastern Pennsylvania.

Honors Programs in Engineering

Upon the recommendation and approval of the engineering faculty, honor students in Engineering will be recognized upon completion of the following requirements: achieving an overall grade point average of 3.25 or better; receiving grades of 3.00 or better in all engineering courses of his or her discipline; pursuing independent research or special projects in engineering; and presenting the results at meetings, conferences, or through publication of a paper. The distinction "Honors in Engineering" will be recorded on the student's transcript upon graduation.

Recommended Course Sequence for a B.S. Degree in Materials Engineering

First Semester		Second Semester	
Chm 115 Elements and Compounds	4	Chm 118 Chemistry for Engineers	3
Mth 111 Calculus I	4	Mth 112 Calculus II	4
SSE 107 Technological Survival	3	EE 244 FORTRAN	3
ME 180 CADD Lab	1	Phy 201 General Physics I	4
Eng 101 Composition I	3	Eng 102 Composition II	3
PE 100 Activity	0	PE 100 Activity	0
	15		17
Third Semester		**Fourth Semester**	
Mth 211 Intro. to Differential Equations	4	Mth 212 Multivariable Calculus	4
Phy 202 General Physics II	4	Phy 203 General Physics III	3
EE 211 Circuit Theory I	3	MAE 200 Materials Engineering	3
EE 283 Electrical Measurements Lab	1	MAE 232 Strength of Materials	3
ME 231 Statics & Dynamics	3	MAE 284 Engineering Measurements Lab	1
Distribution Requirement	3	MAE 324 Heat and Mass Transfer	3
	18		17
Fifth Semester		**Sixth Semester**	
Chm 231 Organic Chemistry I	4	MAE 326 Thermochemical Processing and Kinetics in Materials or MAE 312 Polymers and Composites	3
MAE 201 Professional Development and Ethics	1		
MAE 311 Ceramics or MAE 313 Physical Behavior of Metals	3	MAE 346 Electrochemistry or MAE 332 Mechanical Behavior of Materials	3
MAE 323 Thermodynamics or MAE 333 Structural Characterization	4	MAE Elective	3
MAE Elective	3	ME 318 Quality Control Engineering	3
Distribution Requirement	3	Distribution Requirements	6
	18		18
Seventh Semester		**Eighth Semester**	
MAE 313 Physical Behavior of Metals or MAE 311 Ceramics	3	MAE 312 Polymers and Composites or MAE 326 Thermochemical Processes and Kinetics in Materials	3
MAE 333 Structural Characterization or MAE 323 Thermodynamics	3	MAE 332 Mechanical Behavior of Materials or MAE 346 Electrochemistry	3
MAE 385 Design Problems I	3	MAE 386 Design Problems II	3
MAE 391 Senior Projects I	1	MAE 392 Senior Projects II	2
MAE Elective	3	Distribution Requirements	5
Distribution Requirements	4		16
	17		

MAE Electives may be chosen from any mathematics, science or engineering course numbered 200 or above, with at least six credits in engineering courses including Engineering Management (Engineering Management not to exceed 3 credits). Students desiring electronic materials concentration should select the sequence MAE 272 and 381.

Distribution Requirements are selected to satisfy the General Education Requirements. It is strongly recommended that Soc 391 & 392 be taken along with MAE 391 & 392, and it is required that a two-course sequence be taken in one sub-area of the Heritage and Value requirement.

MAE 200. INTRODUCTION TO MATERIALS SCIENCE AND ENGINEERING **Three credits**

Application of materials properties to engineering design. Introduction to atomic arrangements, crystal structures, imperfection, phase diagrams, and structure-property relations. Fundamentals of iron, steel, and non-ferrous materials. The behavior of materials in environmental conditions. Three hours lecture a week. (same as Phy 210)

Prerequisites: Phy 201, 202.

MAE 201. PROFESSIONAL DEVELOPMENT AND ETHICS **One credit**

Responsibility of an engineer as a professional, ethics in science and engineering; the role of professional societies; recent trends in technological innovations; career planning. Topics in professional development, registration, and licensure.

Prerequisite: Junior standing in materials engineering.

MAE 232. STRENGTH OF MATERIALS **Three credits**

Analysis of statically determinate and indeterminate structural systems; computation of reactions, shears, moments, and deflections of beams, trusses, and frames. Bending and torsion of slender bars; buckling and plastic behavior. Three hours lecture per week. (same as ME 232)

Prerequisite: ME 231.

MAE 272. SOLID STATE DEVICES **Three credits**

Basic properties of semiconductors and their conduction processes, with special emphasis on silicon and gallium arsenide. Physics and characterization of p-n junctions. Homojunction and heterojunction bipolar transistors. Unipolar devices including MOS capacitor and MOSFET. Microwave and Photonic devices. (same as EE 272).

Prerequisite: Basic concepts of Materials Engineering, Modern Physics, including basic quantum and statistical mechanics.

MAE 284. ENGINEERING MEASUREMENTS LAB **One credit**

A laboratory for the measurement of various properties of engineering materials and development of data gathering techniques. Use of instrumentation and transducers for the measurement of various electric parameters, displacement, temperature, and other engineering related quantities. One two-hour laboratory per week. Fee: $35.

Prerequisite: EE 283.

MAE 298. TOPICS IN MATERIALS ENGINEERING **One to three credits**

Selected topics in the field of materials engineering.

Prerequisite: Sophomore or junior standing or permission of instructor.

MAE 311. CERAMICS **Three credits**

Structure and properties of ceramic materials and glasses. Structural imperfections, defect equilibria, atom movement, interfaces, ceramic phase diagrams, and microstructure development. Design and processing of glass and ceramic based products. Three hours lecture a week.

Prerequisites: MAE 200, ME 224 and 232.

Offered in the fall semester of even years.

MAE 312. POLYMERS AND COMPOSITES **Three credits**

Introduction to high polymers as an engineering material. The mechanical, electrical, and optical properties of polymers and polymer applications. Two hours lecture and two hours laboratory a week. Fee: $35.

Prerequisites: MAE 200 and Chm 231.

Offered in the spring semester of even years.

MAE 313. PHYSICAL BEHAVIOR OF METALS **Three credits**
Properties of pure metals, constitution, structure, and properties of alloys. Mechanical and thermal treatments of metals and alloys. Influence of microstructures on properties of metals and alloys. Interaction between properties and engineering design. Three hours lecture a week.
Prerequisite: MAE 200.

MAE 323. THERMODYNAMICS **Four credits**
Fundamental laws of thermodynamics. Phase reaction equilibria. Solution behavior. Quasi chemical theory of alloy phases. Phase diagrams. Four hours lecture a week.
Prerequisite: MAE 200.
Offered in the fall semester of even years.

MAE 324. HEAT AND MASS TRANSFER **Three credits**
Fundamental principles of heat transmission by conduction, convection and radiation; application of the laws of thermodynamics; mass transfer; application of these principles to the solution of engineering problems. Three hours lecture per week. (same as ME 324)
Prerequisites: Phy 201 and Mth 211.

MAE 326. THERMOCHEMICAL PROCESSES AND KINETICS IN MATERIALS **Three credits**
Application of thermochemical and transport principles to the processing and service stability of materials. Thermochemical processes in extractive metallurgy, glass forming, powder technology, energy conversion, advanced materials, and materials in hostile environments are considered in terms of thermodynamics and reaction kinetics. Two hours lecture and two hours laboratory a week. Fee: $40.
Prerequisites: MAE 321, ME 224.
Offered in the spring semester of odd years.

MAE 327. THIN FILM PROCESSING **Three credits**
Nucleation and growth theory: crystalline, amorphous, epitaxial growth morphology. Deposition techniques like DC, RF, Magnetron Sputtering, Ion beam sputtering, evaporation, chemical vapor deposition, physical vapor deposition. Structure, properties and applications for specific thin film processing techniques. Two hours lecture and two hours laboratory a week. Fee: $40.
Prerequisites: MAE 200, Phy 203.

MAE 328. ADVANCED PHASE DIAGRAMS **Three credits**
Phase diagrams of multicomponent systems, isoplethal and isoactivity cooling paths, phase analysis diagrams, microstructure development. Application of phase diagrams to processing, properties, and stability of engineering materials. Three hours lecture a week.

MAE 331. X-RAY DIFFRACTION **Four credits**
Study of structure and composition of solids using X-rays. Effects of annealing, substructures, cold work, preferred orientation, and ordering. Principles of design and applications of X-ray diffraction techniques. Three hours lecture and one three-hour laboratory a week. Fee: $50. (same as Phy 323)
Prerequisite: MAE 200.

MAE 332. MECHANICAL BEHAVIOR OF MATERIALS **Three credits**
The mechanical properties of materials including: elasticity, anelasticity, viscoelasticity, dislocation theory, fracture, fatigue, deformation of single crystal and polycrystalline materials. Testing and deformation processing of materials. Mechanical properties and engineering design parameters. Two hours lecture and two hours laboratory a week. Fee: $40.
Prerequisite: MAE 200.
Offered in the spring semester of even years.

MAE 333. STRUCTURAL CHARACTERIZATION **Three credits**
Study of the crystallography and microstructure of solids with application to lattice parameter determination, identification of unknowns, and crystallographic orientation using X-ray diffraction and microstructure characterization using optical microscopy and scanning electron microscopy. Two hours lecture and one three-hour laboratory a week. Fee: $50.
Prerequisite: MAE 200.
Offered in the fall semester of odd years.

MAE 346. ELECTROCHEMISTRY **Three credits**
Fundamentals of electrochemistry and the application of electrochemical concepts to corrosion, battery development, fuel cells, electroplating, and electrolytic industries. Three hours lecture a week.
Prerequisite: MAE 200.
Offered in the spring semester of odd years.

MAE 381. MICROELECTRONICS LAB **Four credits**
The theoretical and practical aspects of techniques utilized in the fabrication of semi-conductor devices. Crystal growth, solid solubility, alloying and diffusion, oxide masking and epitaxy. Thin and thick film techniques. Device fabrication procedures in microelectronics, and the electrical performance of devices based on these techniques. Ion implantation system and method of fabrication. One hour lecture and one six-hour lab a week. Fee: $50. (same as EE 381)
Prerequisite: Senior engineering standing.

MAE 383-384. ADVANCED ENGINEERING LAB I, II **Three credits each**
Topics of commercial importance in materials science and engineering. Instrumentation, experimental techniques, energy conversion, transformations. Research and development laboratory projects, material process and properties. Six hours lab a week. Fee: $50 per semester.
Prerequisite: Senior MAE standing.

MAE 385. DESIGN PROBLEMS IN MATERIALS ENGINEERING I **Three credits**
One materials design specification project in each of the four major design categories: materials development, materials selection, process design, and apparatus design, is required. Materials' properties, cost, environmental and societal impact, are among the design considerations. Written reports and oral presentations are required. Six hours lab a week. Fee: $50.
Prerequisite: Completion of junior course work.

MAE 386. DESIGN PROBLEMS IN MATERIALS ENGINEERING II **Three credits**
One materials design specification project in each of the four major design categories: materials development, materials selection, process design, and apparatus design, is required. Materials' properties, cost, environmental impact, packaging, consumer considerations, marketing and manufacturing are among the design considerations. Written reports and oral presentations are required. Six hours lab a week. Fee: $50.
Prerequisites: Completion of junior and one semester of senior course work.

MAE 390. INDUSTRIAL TRAINING **One to six credits**
Industrial and/or research experience gained through assignments or jobs with the community, government, business, or industry.
Prerequisite: Approval of the Mechanical and Materials Engineering Department.

MAE 391. SENIOR PROJECTS I **One credit**
Design and development of selected projects in the fields of materials engineering under the direction of a staff member. Technical as well as economic factors will be considered in the design. A professional paper and detailed progress report are required.
Prerequisite: Senior standing in engineering.

MAE 392. SENIOR PROJECTS II — **Two credits**

Design and development of selected projects in the field of materials engineering under the direction of a staff member. Technical as well as economic factors will be considered in the design. This is a continuation of MAE 391. A professional paper to be presented and discussed in an open forum is required.

Prerequisite: MAE 391.

MAE 395-396. INDEPENDENT RESEARCH — **One to three credits each**

Independent study and research for advanced students in the field of the major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.

Prerequisite: Approval of department chairperson is required.

MAE 397. SENIOR SEMINAR — **One to three credits**

Presentations and discussions of selected topics.

Prerequisite: Senior standing in engineering.

MAE 398. TOPICS IN MATERIALS ENGINEERING — **Three credits**

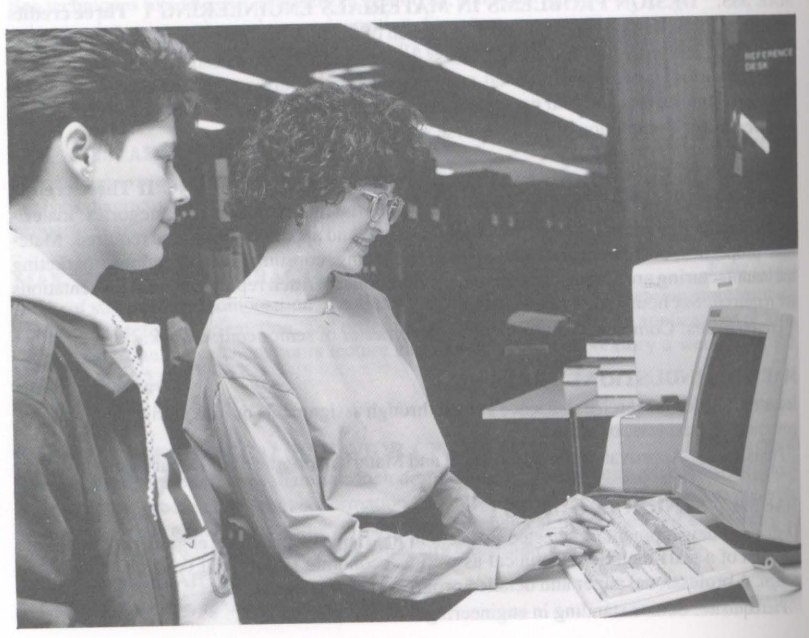
Selected topics in the field of materials engineering. These may include one or more of the following: X-ray diffraction, structure analysis, phase equilibria, metallurgy, ceramics, physical, mechanical, or electrical properties of materials. May be repeated for credit. Three hours lecture a week.

Prerequisite: Junior or senior engineering standing.

MAE 399. COOPERATIVE EDUCATION — **One to six credits**

Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.



MATHEMATICS

Associate Professor Berard, Chairperson; Professors Emeriti Earl, Richards, Salsburg; Professors Koch, Merrill, Sours, Tillman, Wong; Associate Professor DeCosmo; Assistant Professors Gabbert, Kugendran, Lew, Sullivan, Turney.

Total minimum number of credits required for a major in Mathematics leading to the B.A. degree — 129.

Total minimum number of credits required for a major in Mathematics leading to the B.S. degree — 131.

Total minimum number of credits required for a minor in Mathematics — 22 or 23.

Total minimum number of credits required for a minor in Statistics — 23.

Programs of study leading to the B.A. or B.S. degree with a **major or minor in mathematics along with a minor in statistics** are offered by the Department of Mathematics and Computer Science. Also available are the M.S. degree in Mathematics and the M.S. degree in Education with a concentration in mathematics. Graduate programs and a combined five-year B.S.-M.S. degree in Mathematics are described in a separate graduate bulletin.

The Department of Mathematics and Computer Science also offers B.A. and B.S. programs in Computer Science (see page 131), and a B.S. program in Computer Information Systems (see page 128).

Major in Mathematics

The Department offers three tracks through which the baccalaureate degree major requirements in mathematics may be met: general mathematics (GM), applied mathematics (AM), and teacher certification (TC). The program in general mathematics provides preparation for graduate study and research in mathematics. The applied mathematics track prepares students for graduate study in applied mathematics, operations research or statistics, and for careers in industry or government service. The teacher certification track provides preparation for secondary school teaching. The GM and AM tracks, when combined with an appropriate second major or minor, will also provide an excellent foundation for graduate or professional study in business and management; economics; law; medicine; actuarial, computing, engineering, environmental and physical sciences. All three tracks share a common background in abstract algebra, analysis, probability, statistics and computer programming.

The B.A. degree is intended for those who wish to elect more humanities and social science courses, whereas the B.S. degree requires greater concentration in the engineering, natural and physical sciences. Both B.A. and B.S. programs are available in all three tracks. Required courses for a math-

ematics major are indicated in the semester-by-semester curriculum outlines given in the next several pages.

With the approval of the department, a student may earn credits in a maximum of five mathematics or computer science courses by passing special challenge examinations in them. Interested students may obtain further details and application forms from the department chairperson.

Minor in Mathematics

Required Courses:	**credit hours**
Mth 111-112; 202; 211 or 212; 214	19
Electives:	
One of Mth 311 or 331 or 414	3-4
Minimum Total Required	22-23

Minor in Statistics

In a wide range of sciences, both natural and social, statistical analysis is of major importance both in conducting research and in understanding its findings. Likewise, in governmental planning and industrial management, statistical methods are a necessary tool and constitute a major application of mathematics and computing. The minor in statistics is intended to support work in a major either in another mathematical science or in a number of other disciplines.

Required Courses:	**credit hours**
Mth 105-106 or Mth 111-112	8
CS 123 or CS 125	3
Mth 351-352; and Mth 354	9
Electives:	
One of the following: Mth/CS 363; CS 321; or a Topics course in statistics	3
Minimum Total Required	23

Recommended Course Sequence for General and Applied Mathematics Tracks

NOTE: All distribution requirements should be chosen to satisfy the General Education Requirements listed on pages 48-50, except that science electives must be in accordance with the Department's requirements specified on page 241. While all of the courses listed are required, sequencing may vary, provided that the prerequisites are met.

First Semester

	B.A.	B.S.
Mth 111 Calculus I	4	4
Eng 101 Composition I	3	3
CS 125 Computer Science I	3	3
Distribution Requirements	6	6
PE 100 Activity	0	0
	16	16

Second Semester

	B.A.	B.S.
Mth 112 Calculus II	4	4
Eng 102 Composition II	3	3
Distribution Requirements	9	6
Phy 201 General Physics I	—	4
PE 100 Activity	0	0
	16	17

Third Semester

	B.A.	B.S.
Mth 202 Set Theory and Logic	4	4
Mth 211 Intro. to Ordinary Differential Equations	4	4
Science Elective[1]	3	4
Distribution Requirements	6	6
	17	18

Fourth Semester

	B.A.	B.S.
Mth 212 Multivariable Calculus	4	4
Mth 214 Linear Algebra	3	3
Science Elective[1]	3	3
Distribution Requirements	6	6
	16	16

Fifth Semester

	B.A.	B.S.
Mth 331 Intro. to Abstract Algebra I	4	4
Mth 351 Probability and Mathematical Statistics I	3	3
Distribution Requirement	—	3
Free Elective	9	6
	16	16

Sixth Semester

	B.A.	B.S.
Mth 311 Functions of a Real Variable	4	4
Mth/CS Elective[2]	3	3
Free Electives	9	9
	16	16

Seventh Semester

	B.A.	B.S.
Mth 391 Senior Seminar	1	1
Mth/CS Electives[2]	3	6
Free Electives	12	9
	16	16

Eighth Semester

	B.A.	B.S.
Mth 392 Senior Seminar	2	2
Mth/CS Elective[2]	3	3
Free Electives	11	11
	16	16

[1] See page 241 for the Department's requirements regarding science electives.
[2] See page 241 for the Department's requirements regarding Mth/CS electives.

Recommended Course Sequence for Teacher Certification Mathematics Track

NOTE: All distribution requirements should be chosen to satisfy the General Education Requirements listed on pages 48-50, except that science electives must be in accordance with the Department's requirements specified on page 241. While all of the courses listed are required, sequencing may vary, provided that the prerequisites are met.

First Semester

	B.A.	B.S.
Mth 111 Calculus I	4	4
Eng 101 Composition I	3	3
CS 125 Computer Science I	3	3
Distribution Requirements	6	6
PE 100 Activity	0	0
	16	16

Second Semester

	B.A.	B.S.
Mth 112 Calculus II	4	4
Eng 102 Composition II	3	3
Psy 101 General Psychology	3	3
Distribution Requirements	6	3
Phy 201 General Physics I	—	4
PE 100 Activity	0	0
	16	17

Third Semester

	B.A.	B.S.
Mth 202 Set Theory and Logic	4	4
Ed 201 Effective Teaching	3	3
Science Elective[1]	3	4
Distribution Requirements	6	6
	16	17

Fourth Semester

	B.A.	B.S.
Mth 212 Multivariable Calculus	4	4
Mth 214 Linear Algebra	3	3
Ed 202 Educational Psychology	3	3
Science Elective[1]	3	3
Distribution Requirement	3	3
	16	16

Fifth Semester

	B.A.	B.S.
Mth 331 Intro. to Abstract Algebra I	4	4
Mth 343* Intro. to Geometry	3	3
Free Electives	6	3
Distribution Requirements	3	6
Ed 354 Multicultural Education	2	2
	18	18

Sixth Semester

	B.A.	B.S.
Mth 311 Functions of a Real Variable	4	4
Mth/CS Electives[2]	3	6
Ed 357 Content Area Reading	2	2
Free Electives	6	3
	15	15

1 See page 241 for the Department's requirements regarding science electives.
2 See page 241 for the Department's requirements regarding Mth/CS electives.
*Mth 303 and Mth 343 are offered in alternate years; one of them should be taken in the junior year, the other in the senior year.

Seventh Semester

	B.A.	B.S.
Mth 303* The Teaching of Mathematics in Secondary Schools	4	4
Mth 351 Probability and Mathematical Statistics I	3	3
Mth 391 Senior Seminar	1	1
Mth/CS Elective[2]	—	3
Free Electives	8	5
	16	16

Eighth Semester

	B.A.	B.S.
Ed 382 Intern Teaching	15	15
	15	15

1 See below for the Department's requirements regarding science electives.
2 See below for the Department's requirements regarding Mth/CS electives.
*Mth 303 and Mth 343 are offered in alternate years; one of them should be taken in the junior year, the other in the senior year.

Science Electives for Mathematics Majors:

B.A. candidates: Two courses in Biology, Chemistry, GeoEnvironmental Sciences or Physics.

B.S. candidates: Physics 201 and a two-semester sequence in Biology, Chemistry, Earth and Environmental Sciences, or Physics

or

Physics 201-202 and at least three credits in Biology, Chemistry, Earth and Environmental Sciences, Physics, Philosophy 250 or Philosophy 352, EE 341 or EE 342 or any Engineering course not cross-listed in Computer Science. *(All eleven credits must be in courses numbered above 200 except that Bio 121, 122, Chm 115, 116, or 118 are also acceptable in this requirement.)*

Mathematics/Computer Science Electives for Mathematics Majors:

General Mathematics Track:
One of the following courses: Mth 413, 432, or 442; and
One of the following courses: Mth 352, 361, 362, 363, 414, or 464; and
for B.A. candidates: Any one Mth or CS course numbered above 200.*
B.S. candidates: Any two Mth or CS courses numbered above 200.*

Applied Mathematics Track:
Two of the following courses: Mth 352, 361, 362, 363, 414, or 464; and
for B.A. candidates: Any one Mth or CS course numbered above 200.*
B.S. candidates: Any two Mth or CS courses numbered above 200.*

Teacher Certification Mathematics Track:
One of the following courses: Mth 352, 361, 362, 363, 414, or 464; and
for B.S. candidates: Any two Mth or CS courses numbered above 200.*

*Mth 303 is not counted in this requirement.

Summary of Minimum Credit Distribution:

General and Applied Mathematics Tracks	B.A.	B.S.
Mth 111, 112, 202, 211, 212, 214, 311, 331, 351, 391, and 392	37	37
Mth/CS Electives	9	12
CS 125	3	3
Phy 201	—	4
Science Electives	6	7
Eng 101-102	6	6
Distribution Requirements	27	27
Free Electives	41	35
Total	129	131

Teacher Certification Mathematics Track	B.A.	B.S.
Mth 111, 112, 202, 212, 214, 303, 311, 331, 343, 351, and 391	38	38
Mth/CS Electives	3	9
CS 125	3	3
Phy 201	—	4
Science Electives	6	7
Eng 101-102	6	6
Ed 201, 202, 354, 357, and 382	25	25
Proficiency Examination	—	—
Psy 101	3	3
Distribution Requirements	24	24
Free Electives	20	11
Total	128	130

MTH 84. COLLEGE PREPARATORY MATHEMATICS **Three credits***

Designed for students who need to review basic mathematics skills before taking Mth 100, 101, 103, or 150. Topics include a review of arithmetic, introductory algebra, and quantitative reasoning. Only P (passed) or F (failed) grades are given.

***Credits in this course will not be counted toward the graduation requirement in any degree program at Wilkes.**

Offered every fall and summer.

MTH 100. PRE-CALCULUS MATHEMATICS **Four credits**

A course in advanced algebra and trigonometry designed to prepare students for calculus. Content of this course should normally be studied in secondary school.

Prerequisite: Two years of secondary school mathematics in algebra and geometry.

Offered every fall, spring, and summer.

MTH 101. SOLVING PROBLEMS USING MATHEMATICS **Three credits**

An introduction to the methodology of mathematical modeling as a technique in working towards the solution to real world problems. In an effort for the nonspecialist to gain an appreciation of the use of mathematics in our society, topics are selected from among the following: basic voting theory, fair division schemes, routing problems, population growth, and descriptive statistics and probability.

Offered every fall, spring, and summer.

MTH 103. MATHEMATICS FOR ELEMENTARY SCHOOL TEACHERS I **Three credits**

A study of the theory of arithmetic, structure of the number systems, and other topics relevant to the teaching of mathematics in elementary schools.

Prerequisite: Admission to the Teacher Education Program or consent of instructor.

Offered every fall.

MTH 104. MATHEMATICS FOR ELEMENTARY SCHOOL TEACHERS II **Three credits**

A continuation of Mth 103. Topics include elementary probability, statistics, and geometry.

Prerequisite: Mth 103.

Offered every spring.

MTH 105. CALCULUS FOR LIFE, MANAGERIAL, AND SOCIAL SCIENCES I **Four credits**

Topics include: algebra review, limits, differentiation, and integration. Not open to students with credits in Mth 111.

Prerequisites: Mth 100 or at least three years of secondary school mathematics, including Geometry and Algebra II.

Offered every fall, spring, and summer.

MTH 106. CALCULUS FOR LIFE, MANAGERIAL, AND SOCIAL SCIENCES II **Four credits**

A continuation of Mth 105. Topics include: partial differentiation, differential equations, and probability. Not open to students with credits in Mth 112.

Prerequisite: Mth 105.

Offered every spring and summer.

MTH 111. CALCULUS I **Four credits**

Calculus of functions of one variable. Topics include: functions, limits and continuity, derivatives and their applications, and definite integrals. Not open to students with credits in Mth 105.

Prerequisites: Mth 100 or at least three years of secondary school mathematics including Geometry, Algebra II, and topics in Trigonometry.

Offered every fall, spring, and summer.

MTH 112. CALCULUS II **Four credits**

A continuation of Mth 111. Topics include inverse functions, techniques of integration, applications of the integral, and infinite sequences and series. Not open to students with credit in Mth 106.

Prerequisite: Mth 111.

Offered every fall, spring, and summer.

MTH 150. ELEMENTARY STATISTICS **Three credits**

Elementary statistical inference, with an emphasis on ideas, techniques, and applications in the life, physical, and social sciences. Topics include descriptive statistics, confidence intervals, hypothesis testing, contingency tables, multiple regression, and analysis of variance. Not open to mathematics majors or students with credit in Mth 351.

Prerequisite: Two years of high school algebra.

Offered every fall, spring, and summer.

MTH 202. SET THEORY AND LOGIC **Four credits**

Provides a foundation in logic and set theory for upper-level courses in mathematics and computer science. Topics include the logic and language of proofs, the axiomatic method, sets, relations, and functions.

Prerequisite: Mth 112 or consent of instructor.

Offered every fall.

MTH 211. INTRODUCTION TO ORDINARY DIFFERENTIAL EQUATIONS **Four credits**

First-order and linear higher-order differential equations; matrices, determinants, and systems of differential equations; numerical and power series methods of solution; the Laplace transform.

Prerequisite: Mth 112.

Offered every fall and summer.

MTH 212. MULTIVARIABLE CALCULUS **Four credits**

Differential and integral calculus of real and vector valued functions. Topics include continuity, partial differentiation, implicit functions, Taylor's Theorem, gradient, curl, line, surface and multiple integrals, inverse functions, theorems of Green and Stokes.

Prerequisite: Mth 112.

Offered every spring and summer.

MTH 214. LINEAR ALGEBRA **Three credits**

An axiomatic approach to vector spaces, linear transformations, systems of linear equations, eigenvalues and eigenvectors.

Prerequisite: Mth 112 or consent of instructor.

Offered every spring.

MTH 303. THE TEACHING OF MATHEMATICS IN SECONDARY SCHOOLS **Four credits**

This course deals with educational perspectives which pertain to the teaching of mathematics at the secondary level (grades 7 through 12). Topics of discussion include recommendations by the National Council of Teachers of Mathematics (NCTM) regarding instructional methods, assessment techniques, and curricular issues. 30 hours practicum. (same as ED 303G)

Prerequisites: Junior standing in mathematics and admission to the Teacher Education Program.

Offered in the fall semester of odd years.

MTH 311. REAL ANALYSIS **Four credits**

A rigorous study of the topology of the real line, limits, continuity, differentiation, integration, and series of functions.

Prerequisite: Mth 202 or consent of instructor.

Offered every fall.

MTH 331. ABSTRACT ALGEBRA I **Four credits**

A rigorous study of elementary number theory, groups, rings, and fields.

Prerequisite: Mth 202 or consent of instructor.

Offered every spring.

MTH 343. GEOMETRY **Three credits**

A study of selected topics from Euclidean and non-Euclidean geometry.

Prerequisite: Mth 202 or consent of instructor.

Offered in the fall semester of even years.

MTH 351. PROBABILITY AND MATHEMATICAL STATISTICS I **Three credits**

Random variables, probability distributions, expectation and limit theorems, confidence intervals.

Prerequisite: Mth 106 or 112 or consent of instructor.

Offered every fall.

MTH 352. PROBABILITY AND MATHEMATICAL STATISTICS II **Three credits**

Hypothesis testing, non-parametric methods, multivariate distributions, introduction to linear models.

Prerequisite: Mth 351 or consent of instructor.

Offered in the spring semester of odd years.

MTH 354. STATISTICAL METHODOLOGY **Three credits**

This course emphasizes applications, using statistical computer packages (SPSS or BMDP) and real data sets from a variety of fields. Topics include estimation and testing; stepwise regression; analysis of variance and covariance; design of experiments; contingency tables; and multivariate techniques, including the log-linear model.

Prerequisite: Mth 150 or Mth 351 or consent of instructor.

Offered in the spring semester of even years.

MTH 360. LINEAR PROGRAMMING **Three credits**

Graphical linear programming, simplex algorithm and sensitivity analysis. Special L.P. models such as the transportation problem, transshipment problem, and assignment problem. May include integer programming, branch and bound algorithm, geometric programming, goal programming. (same as CS 360)

Prerequisites: Mth 106 or Mth 112; CS 123 or CS 125.

Offered in the fall semester of odd years.

MTH 361. APPLIED MATHEMATICS I **Three credits**

Intended for physical science and engineering students. Topics include inner product spaces, operator algebra, eigenvalue problems, Sturm-Liouville theory, Fourier series and partial differential equations.

Prerequisites: Mth 211 and 212.

Offered in the fall semester of odd years.

MTH 362. APPLIED MATHEMATICS II **Three credits**

Intended for physical science and engineering students. Topics include systems of linear differential equations; nonlinear differential equations; qualitative, numerical, and finite difference methods; theorems of Green and Stokes and the Divergence Theorem.

Prerequisites: Mth 211 and 212.

Offered in the spring semester of even years.

MTH 363. OPERATIONS RESEARCH **Three credits**

A survey of operations research topics such as decision analysis, inventory models, queueing models, dynamic programming, network models, heuristic models, and non-linear programming. (same as CS 363)

Prerequisites: CS 123 or CS 125; Mth 106 or Mth 112; and some elementary knowledge of matrices.

Offered every spring.

MTH 391-392. SENIOR SEMINAR **One credit, two credits**

Presentations and discussions of selected topics in mathematics, conducted by students and faculty.

Prerequisite: Senior standing in mathematics or approval of department chairperson.

Offered every fall and spring.

MTH 395-396. INDEPENDENT STUDY IN MATHEMATICS **Variable credit**

Individual study in a chosen area of mathematics under the supervision of a faculty member. May be repeated for credit.

Prerequisite: Approval of department chairperson.

MTH 397. SEMINAR **One to three credits**
Presentations and discussions of selected topics.
Prerequisite: Approval of department chairperson.

MTH 399. COOPERATIVE EDUCATION **One to six credits**
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)
Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

MTH 413. FUNCTIONS OF SEVERAL VARIABLES **Three credits**
A modern treatment of calculus of functions of several real variables. Topics include: Euclidean spaces, differentiation, integration on manifolds leading to the classical theorems of Green and Stokes.
Prerequisites: Mth 214 and 311.
Offered when demand warrants.

MTH 414. COMPLEX ANALYSIS **Three credits**
Complex functions, limit, continuity, analytic functions, power series, contour integration, Laurent expansion, singularities and residues.
Prerequisite: Mth 212 or consent of instructor.
Offered in the fall semester of even years.

MTH 432. ABSTRACT ALGEBRA II **Three credits**
A continuation of Mth 331. Polynomial rings, ideals, field extensions, and Galois Theory.
Prerequisite: Mth 331.
Offered when demand warrants.

MTH 442. TOPOLOGY **Three credits**
Metric spaces, topological spaces, countability and separation axioms, compactness, connectedness, product spaces.
Prerequisite: Mth 311 or consent of instructor.
Offered when demand warrants.

MTH 464. NUMERICAL ANALYSIS **Three credits**
Numerical methods of differentiation, integration, solution of equations and of differential equations with emphasis on problems that lend themselves to solution using computers (same as CS 364).
Prerequisites: Mth 211, and CS 123 or CS 125, or consent of instructor.
Offered in the spring semester of odd years.

MTH 470. READING COURSE **One to three credits**
Advanced study of special topics under the supervision of a faculty member. Designed for students who have completed a substantial amount of course work in mathematics. May be repeated for credit.
Prerequisites: Senior standing and approval of department chairperson.

MTH 198/298/398/498. TOPICS IN MATHEMATICS **Variable credits**
A study of topics of special interest. It may be a continuation and intensive study of topics begun in the upper-level courses in analysis, topology, algebra, and probability. May be repeated for credit.
Prerequisite: Varies with topics studied.

Additional 500-level graduate courses in mathematics are open to qualified mathematics majors. See the graduate bulletin for complete listing.

MECHANICAL ENGINEERING

Professor Orehotsky, Acting Chairperson; Professor Faut; Associate Professors Ghorieshi, Kalim, Maxwell, Razavi; Assistant Professors Janecek, Mirman; Technical Support Staff: Lennox, Sickler, Wilk.

Total minimum number of credits required for a major in Mechanical Engineering leading to the B.S. degree — 133.

The Department of Mechanical and Materials Engineering offers both four- and five-year degree programs in Mechanical Engineering. These programs provide strong engineering and scientific experience with advanced techniques heavily integrated into the curriculum. Students intending to major in engineering are encouraged to be well prepared in the sciences and mathematics. The first year of course work is common to all engineering programs.

The four-year program in Mechanical Engineering leading to the Bachelor of Science degree offers various specializations. Specialization is achieved through the appropriate selection of the technical electives and involves areas of concentration such as structural analysis, thermal sciences, and manufacturing engineering.

The five-year program in mechanical engineering offers the student the opportunity to obtain a broader education in the arts and sciences, while completing the requirements for a major in engineering. Upon successful completion of this program, the student is awarded a B.S. degree in mechanical engineering. A student may elect to enter this program at any time during his or her period of study. The timing of this entry is critical, due to the sequential nature of the courses in engineering.

The student professional chapters of the Society of Women Engineers (S.W.E.), the Pennsylvania Society of Professional Engineers (P.S.P.E.) and the American Society of Mechanical Engineers (A.S.M.E.), in conjunction with the Department, periodically offer seminars on subjects of a timely nature. Attending these seminars and taking the E.I.T. (Engineering-In-Training) exam are mandatory for the completion of the degree. Students are also highly encouraged to participate in the activities of other on-campus organizations such as the Engineering Club and the National Adventure Klub for Engineering and Design.

In 1979 the Technology Transfer Program (TTP) was initiated to enable the community to draw upon the department's technical expertise and advanced facilities in Northeastern Pennsylvania. This effort is directed to assist in the development and expansion of industries, and the establishment of high technology facilities in Northeastern Pennsylvania.

Honors Programs in Engineering

Upon the recommendation and approval of the engineering faculty, honor students in Engineering will be recognized upon completion of the following requirements: achieving an overall grade point average of 3.25 or better; receiving grades of 3.00 or better in all engineering courses of his or her discipline; pursuing independent research or special projects in engineering; and presenting the results at meetings, conferences, or through publication of a paper. The distinction "Honors in Engineering" will be recorded on the student's transcript upon graduation.

Recommended Course Sequence for a B.S. Degree in Mechanical Engineering

First Semester		Second Semester	
Chm 115 Elements and Compounds	4	Chm 118 Chemistry for Engineers	3
Mth 111 Calculus I	4	Mth 112 Calculus II	4
SSE 107 Technological Survival	3	EE 244 FORTRAN	3
ME 180 CADD Lab	1	Phy 201 General Physics I	4
Eng 101 Composition I	3	Eng 102 Composition II	3
PE 100 Activity	0	PE 100 Activity	0
	15		17
Third Semester		**Fourth Semester**	
Mth 211 Intro. to Differential Equations	4	Mth 212 Multivariable Calculus	4
EE 211 Circuit Theory I	3	ME 232 Strength of Materials	3
EE 283 Electrical Measurements Lab	1	ME 322 Thermodynamics	3
ME 231 Statics & Dynamics	3	MAE 200 Materials Engineering	3
Phy 202 General Physics II	4	MAE 284 Engineering Measurements Lab	1
Distribution Requirement	3	Distribution Requirement	3
	18		17
Fifth Semester		**Sixth Semester**	
ME 201 Prof. Development & Ethics	1	ME 324 Heat Transfer	3
ME 211 Introduction to Manufacturing	3	ME 326 Heat Transfer Lab	1
ME 321 Fluid Mechanics	3	ME 332 Dynamics & Vibration	3
ME 323 Fluid Mechanics Lab	1	EE 314 Control Systems	3
Phy 221 Electronic Instruments	3	ME Elective	3
ME Elective	3	Distribution Requirement	3
Distribution Requirement	3		
	17		16

Seventh Semester		Eighth Semester	
ME 315 Computer Integrated Manufacturing	3	ME 384 Mechanical Design Lab	4
ME 317 Robotics	3	ME 392 Senior Projects II	2
ME 333 Machine Design	3	EgM 320 Engineering Project Analysis	3
ME 391 Senior Projects I	1	ME Elective	3
ME Elective	3	Distribution Requirements	5
Distribution Requirements	4		17
	17		

ME Electives may be chosen from any mathematics, science or engineering course numbered 200 or above, with at least 6 credits in engineering. Students desiring concentrations should consult their advisor for proper ME electives. Distribution Requirements are selected to satisfy the General Education Requirements and it is required that a two-course sequence be taken in one sub-area of the Heritage and Value requirement.

ME 180. CADD LAB **One credit**

An introduction to the symbolic and visual languages used in the various engineering fields. The use of the computer in design and drafting and familiarization with various software packages in the CADD (Computer Aided Design and Drafting) laboratory. Blueprint reading and printed circuit layouts. Emphasis will also be placed on the representation and interpretation of data in graphical form as well as the fundamentals of 2-dimensional and 3-dimensional graphic formats. Two hours lecture/laboratory per week. Fee: $20.

Prerequisite: To be taken along with or after EE/EgM/ENV/MAE/ME 121.

ME 201. PROFESSIONAL DEVELOPMENT AND ETHICS **One credit**

Responsibility of an engineer as a professional, ethics in science and engineering; the role of professional societies; recent trends in technological innovations; career planning. Topics in professional development, registration, and licensure.

Prerequisite: Junior standing in mechanical engineering.

ME 211. INTRODUCTION TO MANUFACTURING **Three credits**

An introduction to manufacturing focusing on the historical manufacturing processes as well as current topics of interest, such as computer-integrated manufacturing, numerical control, and quality control. Three hours lecture a week.

Prerequisite: Junior standing in engineering or consent of instructor.

ME 213. FACTORY SIMULATION **Three credits**

Introduction to system analysis and simulation, principles of manufacturing systems, and the analysis of discrete computer simulation models. Associated laboratory experiments consider introduction to SIMFACTORY; and design analysis and control of computer simulation model in the factory. Two-hour lecture and two-hour laboratory a week. Fee: $40.

Prerequisite: Junior/senior standing in ME.

ME 214. FLEXIBLE MANUFACTURING SYSTEM **Three credits**

Introduction to CAD/CAM, computer assisted process planning, group technology, manufacturing control by computer, NC/CNC/DNC, programmable controllers, robotics, automation, flexible manufacturing system (FMS), computer integrated manufacturing (CIM). Associated laboratory experiments consider the operation of NC/CNC/DNC, robotics, and FMS. Two-hour lecture and two-hour laboratory a week. Fee: $40.

Prerequisite: Junior/senior standing in ME.

ME 231. STATICS AND DYNAMICS **Three credits**
Equilibrium of force systems; computation of reactions and internal forces; determination of centroids and moments of inertia. Kinematics and dynamics of particles and rigid bodies; Newton's laws, kinetics and potential energy, linear and angular momentum, impulse, and inertia properties. Three hours lecture per week. (same as Phy 211)
Prerequisite: Phy 201, Mth 112.

ME 232. STRENGTH OF MATERIALS **Three credits**
Analysis of statically determinate and indeterminate structural systems; computation of reactions, shears, moments, and deflections of beams, trusses, and frames. Bending and torsion of slender bars; buckling and plastic behavior. Three hours lecture per week.
Prerequisite: ME 231.

ME 298. TOPICS IN MECHANICAL ENGINEERING **One to three credits**
Selected topics in the field of mechanical engineering.
Prerequisite: Sophomore or junior standing or permission of instructor.

ME 312. MANUFACTURING SYSTEM ENGINEERING **Three credits**
Fundamentals of Manufacturing Systems, process systems for manufacturing, management systems for manufacturing optimization and economics of manufacturing, automation in manufacturing systems, information systems for manufacturing. Three one-hour lectures.
Prerequisite: Senior standing in ME.

ME 315. COMPUTER INTEGRATED MANUFACTURING **Three credits**
The meaning of the "I" in CIM: Data and Operations Integrations. A typical CIM chain. CIM Integration model. The component of CIM: Stages of Development of CIM components; Computer-Aided Design (CAD); Computer-Aided Planning (CAP); Computer-Aided Manufacturing (CAM); Computer-Quality Assurance (CAQ). Interfaces between CIM components. Implementation of CIM: Methods of developing a CIM strategy; CIM prototypes. Further development: Design state cost estimation. Decision support system in CIM. Two one-hour lectures and two hours lab. Fee: $40.
Prerequisite: Senior standing in ME.

ME 316. EXPERT SYSTEMS IN CIM **Three credits**
Design of a prototype expert system using microcomputer to aid in the planning and control of manufacturing systems. Presents a number of computer models to enhance decision making in such areas as forecasting, inventory, production planning, scheduling, material requirement planning, and goal planning. Design of the prototype expert system by combining those models into several knowledge based systems. Two hours lecture and two hours laboratory. Fee: $40.
Prerequisite: Junior/senior standing in ME.

ME 317. ROBOTICS **Three credits**
The analysis and design of robots. Class covers the mechanical principles which govern the kinematics of robotics. Course topics include forward kinematics, and the determination of the closed form kinematic inversion, as well as workspace and trajectory generation. Class also covers the formation and computation of the manipulator Jacobian matrix.
Prerequisites: The student must have a calculus class and a fortran programming class. It would be preferred if the student takes a linear algebra class as a prerequisite.

ME 318. QUALITY CONTROL ENGINEERING **Three credits**
Quality control in the manufacturing environment; statistical methods used in quality assurance; statistical process control; acceptance sampling prerequisite. Three one-hour lectures per week.
Prerequisite: Mth 150 or consent of instructor.

ME 321. FLUID MECHANICS **Three credits**
Thermodynamics and dynamic principles applied to fluid behavior, ideal, viscous, and compressible fluids under internal and external flow conditions. (same as Phy 213)
Prerequisite: ME 231.

ME 322. THERMODYNAMICS **Three credits**
The fundamental concepts and laws of thermodynamics, thermodynamic properties of perfect and real gases, vapors, solids and liquids. Applications of thermodynamics to power and refrigeration cycles, and flow processes. Development of thermodynamic relationships and equations of state. Review of the first and second laws. Availability and irreversibility. Lecture-discussion, three hours a week.
Prerequisites: Phy 106 or 202 and Mth 211 or 212.

ME 323. FLUID MECHANICS LABORATORY **One credit**
Experiments with and analysis of basic fluid phenomena hydrostatic pressure, Bernoulli theorem, laminar and turbulent flow, pipe friction, and drag coefficient. One three-hour lab per week. Fee: $40.
Prerequisite: Concurrent or after ME 321.

ME 324. HEAT AND MASS TRANSFER **Three credits**
Fundamental principles of heat transmission by conduction, convection and radiation; application of the laws of thermodynamics; mass transfer; application of these principles to the solution of engineering problems. Three hours lecture per week.
Prerequisites: Phy 201 and Mth 211.

ME 325. ENERGY SYSTEMS **Three credits**
Fundamental principles of energy transmission and energy conversion. Comprehension of the physical systems in which the conversion of energy is accomplished. Primary factors necessary in the design and performance analysis of energy systems. Three hours lecture per week.
Prerequisites: Phy 340, ME 224.

ME 326. HEAT TRANSFER LABORATORY **One credit**
Basic heat transfer modes are demonstrated experimentally. This includes conduction, convection, and radiation of heat as well as fin and heat exchanger. One two-hour lab per week. Fee: $40.
Prerequisite: Concurrent with or after ME 224.

ME 328. COMBUSTION ENGINES **Three credits**
Investigation and analysis of internal and external combustion engines with respect to automotive applications. Consideration of fuels, carburetion, combustion, detonation, design factors, exhaust emissions, and alternative power plants. Three one-hour lectures per week.
Prerequisite: Phy 340.

ME 331. STRUCTURAL ANALYSIS AND DESIGN **Three credits**
Stress tensor and analysis of strain. Laws of conservation and basic equations of elastic and viscoelastic bodies. Plane stress and plane strain, theory of extension, torsion and flexure of beams. Introduction to energy methods and elastic stability. Three hours lecture per week.
Prerequisite: ME 232.

ME 332. DYNAMICS & VIBRATION **Three credits**
An introductory course in mechanical vibration dealing with free and forced vibration of single and multi-degrees of freedom for linear and nonlinear systems. Three one-hour lectures per week.
Prerequisites: Mth 211, ME 231.

ME 333. MACHINE DESIGN **Three credits**
A first course in the design of machine elements, dealing with theories of failure, strength and endurance limit, fluctuating stresses, fatigue, design under torsional and combined stresses. Design of bolted connections, fasteners, welds, springs, balled roller bearings, gears, clutches, brakes, belts, and chains. Three one-hour lectures per week.

Prerequisites: ME 232, 332.

ME 334. KINEMATICS **Three credits**
Analytical graphical solutions for displacements, velocities and accelerations in mechanism. Synthesis of linkages and CAMS. Gears and gear trains. Computing mechanisms. Three one-hour lectures per week.

Prerequisite: ME 231.

ME 335. ENGINEERING MODELING AND ANALYSIS **Three credits**
Introduction to finite element method for static and dynamic modeling and analysis of engineering systems. Finite element formulation and computer modeling techniques for stress, plane strain, beams, axisymmetric solids, heat conduction, and fluid flow problems. Solution of finite element equation and post processing of results for further use in the design problem. Three one-hour lectures per week.

Prerequisites: EE 244, ME 232.

ME 336. CAE IN MECHANICAL DESIGN **Three credits**
Computer techniques for the design of mechanical systems and components. Engineering software development including computer graphics. System design of individual applications of mechanical and thermal components. Two-hour lecture and two-hour laboratory. Fee: $40.

Prerequisites: ME 224, 232.

ME 384. MECHANICAL DESIGN LABORATORY **Four credits**
Advanced open-ended laboratory simulating RD&D environment. Emphasis on experimental performance, evaluations, and design. Topics include mechanical system, thermo/fluids, manufacturing processes, and mechanics. One hour lecture, six hours lab per week. Fee: $50.

Prerequisite: Senior standing in mechanical engineering.

ME 390. INDUSTRIAL TRAINING **One to six credits**
Industrial and/or research experience gained through assignments or jobs with the community, government, business, or industry.

Prerequisite: Approval of the Mechanical and Materials Engineering Department.

ME 391. SENIOR PROJECTS I **One credit**
Design and development of selected projects in the field of mechanical engineering under the direction of a staff member. Technical as well as economic factors will be considered in the design. A detailed progress report is required.

Prerequisite: Senior standing in mechanical engineering.

ME 392. SENIOR PROJECTS II **Two credits**
Design and development of selected projects in the various fields of mechanical engineering under the direction of a staff member. Technical as well as economic factors will be considered in the design. A professional paper and detailed progress reports are required. This is a continuation of ME 391. An open-forum presentation and discussion of the professional paper is required.

Prerequisite: ME 391.

ME 395-396. INDEPENDENT RESEARCH **One to three credits**
Independent study and research for advanced students in the field of mechanical engineering under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.

Prerequisite: Senior standing and approval of department chairperson is required.

ME 397. SEMINAR **One to three credits**
Presentations and discussions of selected topics.

Prerequisite: Senior standing or by special departmental permission.

ME 398. TOPICS IN MECHANICAL ENGINEERING **One to three credits**
Selected topics in the field of mechanical engineering. These may include one or more of the following: control systems, automation, robotics, manufacturing systems, solid Mechanics, energy systems, fluid flow, acoustics, computer systems, bio-mechanics. May be repeated for credit.

Prerequisite: Junior or senior engineering standing.

ME 399. COOPERATIVE EDUCATION **One to six credits**
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

MEDICAL TECHNOLOGY

Professor Turoczi; Assistant Professor Pidcock; Adjunct Faculty Brian D. Spezialetti (Program Director, Medical Technology Program, Robert Packer Hospital), Madeline Bonadies (Educational Coordinator, School of Medical Technology, The Somerset Medical Center), Mary Gene Butler (Educational Coordinator, School of Medical Technology Consortium), Alfred S. Conston (Medical Director, School of Medical Technology, The Somerset Medical Center), Deborah L. Johnson (Educational Coordinator, School of Medical Technology, Allentown Hospital Association), C. Warren Koehl (Medical Director, School of Medical Technology, Wilkes-Barre General Hospital), Alexander Nedwick (Medical Director, School of Medical Technology, Allentown Hospital Association), Michael G. Hromchak (Educational Coordinator, School of Medical Technology, Wilkes-Barre General Hospital), Donald R. Weaver (Medical Director, Medical Technology Program, Robert Packer Hospital).

Total minimum number of credits required for a major in Medical Technology leading to the B.S. degree — 124.

The National Accrediting Agency for Clinical Laboratory Science recommends certain requirements for a program of training leading to a B.S. degree. The curriculum offered at Wilkes University follows these recommendations and is presented below.

At the completion of three years, the student may be accepted by an affiliated program of medical technology for a period of twelve months' clinical training. Following graduation from the program, the student will receive the B.S. degree in medical technology from the University and will be eligible for certification as a medical technologist by the Board of Registry of Medical Technology or as a Clinical Laboratory Scientist by the National Certification Agency for Medical Laboratory Personnel.

Wilkes University has established a formal affiliation with the Allentown Hospital Association in Allentown, Pa., the Robert Packer Hospital in Sayre, Pa., the Scranton Medical Technology Consortium, Scranton, Pa.,

Somerset Medical Center, Somerville, N.J., and the Wilkes-Barre General Hospital in Wilkes-Barre, Pa. Fulfillment of the fourth year requirement at non-affiliated hospitals requires special permission of the department chairperson and of the Academic Standards Committee.

Recommended Course Sequence for a Major in Medical Technology

First Semester

Bio 121 Principles of Modern Biology I	4
Chm 115 Elements and Compounds	4
Eng 101 Composition I	3
Mth 105 or 111 Calculus I	4
PE 100 Activity	0
	15

Second Semester

Bio 122 Principles of Modern Biology II	4
Chm 116 The Chemical Reaction	4
Eng 102 Composition II	3
Mth 106 or 112 Calculus II	4
PE 100 Activity	0
	15

Third Semester

Bio 225 Population and Evolutionary Biology	4
Chm 231 Organic Chemistry I	4
Distribution Requirements	9
	17

Fourth Semester

Bio 226 Cellular and Molecular Biology	4
Chm 232 Organic Chemistry II	4
Distribution Requirements	9
	17

Fifth Semester

Biology 303 Bacteriology	4
Computer Science Elective	3
Phy 105 Introductory Physics I	4
Distribution Requirement	3
	14

Sixth Semester

Bio 341 Immunology and Immunochemistry	4
Bio 397 Seminar	1
Chm 242 Applications of Instrumental Analysis	2
Mth 150 Elementary Statistics	3
Distribution Requirements	6
	16

Seventh Semester

Eighth Semester

MEDICAL TECHNOLOGY PROFESSIONAL STUDY YEAR

The 30 credits supplied by the twelve months' clinical training are divided into the following courses:

Bio 371 Clinical Microbiology	7
Bio 372 Clinical Chemistry	8
Bio 373 Clinical Hematology/Coagulation	5
Bio 374 Clinical Immunohematology	4
Bio 375 Clinical Immunology/Serology	3
Bio 376 Clinical Seminar	3
	30

MILITARY SCIENCE (Army ROTC)

Major Stribrny, Chairperson.

The primary objective of the ROTC program is to develop leadership capabilities and to train future officers for both the active and reserve components of the United States Army.

Military Science instruction for Wilkes University students is offered on campus at King's College or the University of Scranton pursuant to an agreement with the Military Science Department at the University of Scranton. A two-year and four-year program are offered, both of which lead to a commission as an officer in the United States Army. To obtain this commission, qualified male and female students must successfully pass an aptitude test, a physical examination, and complete either the two- or four-year program of approved Military Science courses. While enrolled in the Advanced Courses (Military Science III and IV), the student will receive $100 per month subsistence allowance. Uniforms, equipment, and textbooks required for Army ROTC classes will be supplied by the Army. Students may compete for Army ROTC scholarships while in high school (4-year awards), or during college (3-year awards). Nursing students may compete for 3- and 2-year scholarships while attending college. Scholarships pay tuition (80% or $8,000 per year, whichever is more), textbooks, lab and other academic fees, plus an allowance of up to $1,000 each school year.

Students qualify for advanced ROTC courses (2-year program) in three ways:

(1) **On Campus Courses** — most students take introductory military science courses on campus during their freshman and sophomore years. These courses allow them to learn about the Army and the opportunities and responsibilities of an officer without incurring an obligation. This "basic" program generally involves one course per school term, although students may arrange to compress more than one of the required courses into a single term.

(2) **Summer Programs** — students may also qualify through a paid, six-week, no obligation summer "Basic Camp" which provides intensive military training at Fort Knox, Kentucky. Students may also compress all freshmen and sophomore military science courses during one on-campus summer session.

(3) **Advanced Placement** — students with prior military service, members of the United States Army Reserve or National Guard, or JROTC members may qualify for advanced placement into the advanced Army ROTC courses.

Two-Year Program

Available to qualified students having a minimum of two academic years

remaining to degree completion, and meeting criteria set forth in paragraphs (2) or (3) above. Application for this program must be made prior to the end of the Spring Semester of the sophomore year for those not enrolled in previous Military Science instruction. Also available for accepted graduate students.

Four-Year Program

Consists of all eight Military Science courses (commencing no later than the sophomore year). Enrollment in the first four courses of Military Science (MS I & II) is accomplished in the same manner as any other college course and carries no military obligation. Application to enroll in the Advanced Military Science courses (MS III & IV) must be made while enrolled in Military Science 22.

While enrolled in the Advanced Course, each student is required to successfully complete a six-week paid Advanced Camp at Fort Bragg, North Carolina, normally after completing Military Science 102. Transportation, food, lodging, and medical and dental care, are provided by the Army.

Military Science Courses

MS 11-12. MILITARY SCIENCE I — **Two credits**

Military history designed to provide a fundamental understanding of the Army's organization, structure, and components, and to analyze major events and influences of Army History. Examination of the formulation and implementation of national security policy will be made. The student will also gain an acquaintance with the evolution of warfare, military theory, and the military profession, with particular emphasis on leadership. One hour for two semesters.

MS 21-22. MILITARY SCIENCE II — **Four credits**

Introduction to land navigation, including use of the compass and topographic maps. First aid, to include CPR (Certification available dependent upon student interest). A survey of leadership theory to include leadership models and group dynamics is held. Two hours for two semesters.

MS 101. MILITARY SCIENCE III — **Two credits**

Military skills and professional knowledge subjects designed to instruct the cadet in the principles and techniques of applied leadership, advanced land navigation, and tactics. An introduction to the international agreements governing armed forces, operational planning, and the functions of command and staff is given. Two hours.

Prerequisite: MS 21-22, or equivalent.

MS 102. MILITARY SCIENCE III — **One credit**

Instruction designed to prepare the student for the ROTC Advanced Camp. Emphasis on applied small unit leadership, physical conditioning, practical training on military equipment, tactics and unit drill. Two hours.

MS 121. MILITARY SCIENCE IV — **Two credits**

An examination of mid-level management considerations in the Army. The course addresses the Army's personnel, training and logistics management system. In addition, the cadet is given an overview of the American Military Justice system, the Law of War, and both legal and practical considerations in connection with apprehension and search of personnel, seizure of contraband, and individual rights. Two hours.

MS 122. MILITARY SCIENCE IV — **One credit**

The Army Officer in Contemporary American Society. An introduction to professionalism and military ethics. Provides the cadet with an introduction to the profession, its characteristics, roles and responsibilities; a basic understanding of the professional soldier's responsibilities to the nation and the armed forces; an understanding of the needs for ethical conduct, sensitivity to ethical issues, and improved ethical decision-making skills. Additionally, the course offers outside presentations in the banking and insurance fields. Moreover, a review of logistics, counseling, and written and oral communication is given. Two hours.

MS 130. MILITARY SCIENCE LAB — **No credit**

Required of all Military Science students each semester. Stresses practical application of classroom theory and Army related subjects such as leadership, drill and ceremonies, weapons training, land navigation, first aid, mountaineering, and tactics. Two hours.

NOTE: Students desiring to pursue Military Science studies through to a commission are also required to complete additional courses in computer science, written communications, math, history, psychology and a foreign language. Most of these requirements can be met while satisfying University elective requirements. See the Professor of Military Science for more information.



MUSIC

Associate Professor Reiprich, Chairperson; Adjunct Professor Harrington, Assistant Chair; Professor Emeritus Chapline; Associate Professors Emeriti Garber, Santos; Associate Professor Campbell; Assistant Professors Brown, Flint, Liva; Visiting Assistant Professor Baker; Adjunct Faculty Anastasia, Forbes, Guy, Hanisch, Heinze, Hrynkiw, Jordan, Nowak, Preston, Sanderson, Teubner.

Total minimum number of credits required for a major in Music leading to the B.M. degree — number varies with program.

Purposes

The Music Major at Wilkes University leads to a Bachelor of Music degree. Various concentrations in applied performance studies and music education with certification (K-12) are offered.

The purposes of the program are to:

1. Give students a comprehensive exposure to all aspects of musical training relevant to their degree specialization;
2. Provide for contemporary careers in music;
3. Substantively prepare the student for graduate studies in music.

Objectives

The Music major is a professional academic program for students of superior ability who, by virtue of their musical aptitude and achievements and their general academic background, are qualified to pursue work at the university level.

Certain criteria are recognized as basic to any curriculum in music. There is a comprehensive program of critical and evaluative studies. A command of basic skills widely recognized as attributes of the musician is a major part of this curriculum. These skills have relevance to long-term personal and professional goals. Curricula have been designed to meet the competency-based and performance-oriented technical demands of the craft of music. A major portion of the study will be devoted to the development of the student's potential as a performing musician, with simultaneous attention given to one's specialization as a teacher or scholar. Men and women should be able to express themselves clearly in their language — both in speech and writing, and in the grammar of music. To this end, students should develop skills which demand evidence of critical investigation, analytical thought, and clarity of organization. They should be able to rehearse, perform, criticize, discuss, and analyze music which will provide them a basic command of components considered requisite to success in any part of the field. They should develop familiarity with their musical heritage through constant contact with varied types and styles of literature, and should use this knowledge to illuminate their interpretations. Likewise, all students should have contact with less familiar musical styles and means of music-making, especially 20th century repertoire and practices. It is strongly recommended that students who major in Music take a foreign language.

Recommended Course Sequence for Bachelor of Music — Applied Voice Major

Program completed with 127 semester credits.

First Semester	
Mus 000 Recital Attendance	0
Mus 010 Functional Piano	0
Mus 100 Applied Performance	2
Mus 103 Comp. Musicianship I	2
Mus 105 Harmonic Foundations I	3
Mus 107 Historical Analysis of Music I	3
Mus 121 or 131 Ensemble (Minor)	½
Mus 125 Ensemble (Major)	½
Eng 101 Composition	3
Foreign Language	3
PE 100 Activity	0
	17

Second Semester	
Mus 000 Recital Attendance	0
Mus 010 Functional Piano	0
Mus 100 Applied Performance	2
Mus 104 Comp. Musicianship II	2
Mus 106 Harmonic Foundations II	3
Mus 108 Historical Analysis of Music II	3
Mus 121 or 131 Ensemble (Minor)	½
Mus 125 Ensemble (Major)	½
Eng 102 Composition	3
Foreign Language	3
PE 100 Activity	0
	17

Third Semester	
Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Minor)	½
Mus 125 Ensemble (Major)	½
Mus 200 Applied Performance	2
Mus 203 Comp. Musicianship III	2
Mus 205 Harmonic Foundations III	3
Mus 207 Historical Analysis of Music III	3
Mus 258 Vocal Methods	2
Foreign Language	3
	16

Fourth Semester	
Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Minor)	½
Mus 125 Ensemble (Major)	½
Mus 200 Applied Performance	2
Mus 204 Comp. Musicianship IV	2
Mus 206 Harmonic Foundations IV	3
Mus 208 Historical Analysis of Music IV	3
Mus 259 Voice Diction	2
Foreign Language	3
	16

Fifth Semester	
Mus 000 Recital Attendance	0
Mus 125 Ensemble	½
Mus 128 Chamber Performance	1
Mus 260 Conducting I	2
Mus 300 Applied Performance	2
Mus 305 Composition/Orchestration	2
Mus 307 Pedagogy (Vocal)	3
Psy 101 General Psychology	3
Distribution Requirement	3
	16½

Sixth Semester	
Mus 000 Recital Attendance	0
Mus 125 Ensemble	½
Mus 128 Chamber Performance	1
Mus 261 Choral Conducting II	2
Mus 300 Applied Performance	2
Mus 301 Recital	0
Mus 306 20th Century Theory	2
Distribution Requirement	3
Distribution Requirement	3
	13½

Seventh Semester	
Mus 000 Recital Attendance	0
Mus 125 Ensemble	½
Mus 128 Chamber Performance	1
Mus 400 Applied Performance	2
Mus 407 Music Literature (Voice)	3
Free Elective	3
Distribution Requirements	6
	15½

Eighth Semester	
Mus 000 Recital Attendance	0
Mus 125 Ensemble	½
Mus 400 Applied Performance	2
Mus 401 Recital	0
Mus 410 Chamber Literature	3
Free Electives	4
Distribution Requirements	6
	15½

Recommended Course Sequence for Bachelor of Music — All Applied Instrument Majors

Except Voice and Keyboard

Program completed with 128 semester credits.

First Semester	
Mus 000 Recital Attendance	0
Mus 010 Functional Piano	0
Mus 100 Applied Performance	2
Mus 103 Comp. Musicianship I	2
Mus 105 Harmonic Foundations I	3
Mus 107 Historical Analysis of Music I	3
Mus 121 or 131 Ensemble (Major)	½
Mus 125 Ensemble (Minor)	½
Eng 101 Composition	3
Distribution Requirement	3
PE 100 Activity	0
	17

Second Semester	
Mus 000 Recital Attendance	0
Mus 010 Functional Piano	0
Mus 100 Applied Performance	2
Mus 104 Comp. Musicianship II	2
Mus 106 Harmonic Foundations II	3
Mus 108 Historical Analysis of Music II	3
Mus 121 or 131 Ensemble (Major)	½
Mus 125 Ensemble (Minor)	½
Eng 102 Composition	3
Distribution Requirement	3
PE 100 Activity	0
	17

Third Semester	
Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Major)	½
Mus 125 Ensemble (Minor)	½
Mus 200 Applied Performance	2
Mus 203 Comp. Musicianship III	2
Mus 205 Harmonic Foundations III	3
Mus 207 Historical Analysis of Music III	3
Mus 260 Conducting I	2
Psy 101 General Psychology	3
	16

Fourth Semester	
Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Major)	½
Mus 125 Ensemble (Minor)	½
Mus 200 Applied Performance	2
Mus 204 Comp. Musicianship IV	2
Mus 206 Harmonic Foundations IV	3
Mus 208 Historical Analysis of Music IV	3
Mus 261 or 262 Conducting II	2
Distribution Requirement	3
	16

Fifth Semester	
Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble	½
Mus 128 Chamber Performance	1
Mus 300 Applied Performance	2
Mus 305 Composition/Orchestration	2
Mus 311-316 Pedagogy	3
Distribution Requirements	6
Free Elective	3
	17½

Sixth Semester	
Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble	½
Mus 128 Chamber Performance	1
Mus 300 Applied Performance	2
Mus 301 Recital	0
Mus 306 20th Century Theory	2
Mus 411 Music Literature (Orchestra)	3
Distribution Requirements	6
	14½

Seventh Semester	
Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble	½
Mus 128 Chamber Performance	1
Mus 400 Applied Performance	2
Mus 407-415 Music Literature (major idiom)	3
Free Electives	6
Distribution Requirement	3
	15½

Eighth Semester	
Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble	½
Mus 400 Applied Performance	2
Mus 401 Recital	0
Mus 407-415 Music Literature (Chamber Literature)	3
Free Electives	6
Distribution Requirement	3
	14½

Recommended Course Sequence for Bachelor of Music — Applied Keyboard Major

Program completed with 127 semester credits.

First Semester	
Mus 000 Recital Attendance	0
Mus 100 Applied Performance	2
Mus 103 Comp. Musicianship I	2
Mus 105 Harmonic Foundations I	3
Mus 107 Historical Analysis of Music I	3
Mus 121 or 131 Ensemble (Minor)	½
Mus 125 Ensemble (Major)	½
Eng 101 Composition	3
Distribution Requirement	3
PE 100 Activity	0
	17

Second Semester	
Mus 000 Recital Attendance	0
Mus 100 Applied Performance	2
Mus 104 Comp. Musicianship II	2
Mus 106 Harmonic Foundations II	3
Mus 108 Historical Analysis of Music II	3
Mus 121 or 131 Ensemble (Minor)	½
Mus 125 Ensemble (Major)	½
Eng 102 Composition	3
Distribution Requirement	3
PE 100 Activity	0
	17

Third Semester

Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Minor)	½
Mus 125 Ensemble (Major)	½
Mus 200 Applied Performance	2
Mus 203 Comp. Musicianship III	2
Mus 205 Harmonic Foundations III	3
Mus 207 Historical Analysis of Music III	3
Mus 212 Keyboard Accompanying	2
Mus 260 Conducting I	2
Psy 101 General Psychology	3
	18

Fourth Semester

Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Minor)	½
Mus 125 Ensemble (Major)	½
Mus 200 Applied Performance	2
Mus 204 Comp. Musicianship IV	2
Mus 206 Harmonic Foundations IV	3
Mus 208 Historical Analysis of Music IV	3
Mus 213 Accompanying Practicum	1
Distribution Requirement	3
	15

Fifth Semester

Mus 000 Recital Attendance	0
Mus 125 Ensemble	½
Mus 128 Chamber Performance	1
Mus 214 Accompanying Practicum	1
Mus 261 or 262 Conducting II	2
Mus 300 Applied Performance	2
Mus 305 Composition & Orchestration	2
Mus 309 Pedagogy (Piano)	3
Distribution Requirements	6
	15½ or 17½

Sixth Semester

Mus 000 Recital Attendance	0
Mus 125 Ensemble	½
Mus 128 Chamber Performance	1
Mus 215 Accompanying Practicum	1
Mus 261 or 262 Conducting II	2
Mus 300 Applied Performance	2
Mus 301 Recital	0
Mus 306 20th Century Theory	2
Distribution Requirements	6
	14½ or 16½

Seventh Semester

Mus 000 Recital Attendance	0
Mus 125 Ensemble	½
Mus 128 Chamber Performance	1
Mus 400 Applied Performance	2
Mus 409 Keyboard Literature	3
Distribution Requirement	3
Free Electives	6
	15½

Eighth Semester

Mus 000 Recital Attendance	0
Mus 125 Ensemble	½
Mus 400 Applied Performance	2
Mus 401 Recital	0
Mus 410 Chamber Literature	3
Distribution Requirement	3
Free Electives	6
	14½

Recommended Course Sequence for Bachelor of Music — Music Education Major

Vocal Track (with certification)

Program completed with 137 semester credits.

First Semester

Mus 000 Recital Attendance	0
Mus 010 Functional Piano	0
Mus 100 Applied Performance (Major)	2
Mus 103 Comp. Musicianship I	2
Mus 105 Harmonic Foundations I	3
Mus 107 Historical Analysis of Music I	3
Mus 121 or 131 Ensemble (Minor)	½
Mus 125 Ensemble (Major)	½
Eng 101 Composition	3
Distribution Requirement	3
PE 100 Activity	0
	17

Second Semester

Mus 000 Recital Attendance	0
Mus 010 Functional Piano	0
Mus 100 Applied Performance (Major)	2
Mus 104 Comp. Musicianship II	2
Mus 106 Harmonic Foundations II	3
Mus 108 Historical Analysis of Music II	3
Mus 121 or 131 Ensemble (Minor)	½
Mus 125 Ensemble (Major)	½
Eng 102 Composition	3
Distribution Requirement	3
PE 100 Activity	0
	17

Third Semester

Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Minor)	½
Mus 125 Ensemble (Major)	½
Mus 200 Applied Performance (Major)	1
Mus 200 Applied Performance (Minor)	1
Mus 203 Comp. Musicianship III	2
Mus 205 Harmonic Foundations III	3
Mus 207 Historical Analysis of Music III	3
Mus 260 Conducting I	2
Med 011 Functional Guitar*	0
Med 258 Vocal Methods	2
Psy 101 General Psychology	3
	18

Fourth Semester

Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Minor)	½
Mus 125 Ensemble (Major)	½
Mus 200 Applied Performance (Major)	1
Mus 200 Applied Performance (Minor)	1
Mus 204 Comp. Musicianship IV	2
Mus 206 Harmonic Foundations IV	3
Mus 208 Historical Analysis of Music IV	3
Mus 259 Voice Diction	2
Med 011 Functional Guitar*	0
Distribution Requirement	3
	16

*If choral, elementary, or general music concentration.

Fifth Semester

Mus 000 Recital Attendance	0
Mus 125 Ensemble (Major)	½
Mus 261 Choral Conducting II	2
Mus 300 Applied Performance (Major)	1
Mus 300 Applied Performance (Minor)	1
Med 250 Teaching of Elementary Music	2
Med 254-257 Instrumental Methods	2
Ed 201 Effective Teaching	3
Distribution Requirements	6
	17½

Sixth Semester

Mus 000 Recital Attendance	0
Mus 125 Ensemble (Major)	½
Mus 300 Applied Performance (Major)	1
Mus 300 Applied Performance (Minor)	1
Med 202 Practicum in Music Education	1
Med 252 Teaching of General Music	2
Ed 202 Educational Psychology	3
Distribution Requirements	6
Free Elective	3
	17½

Seventh Semester		Eighth Semester	
Mus 000 Recital Attendance	0	Mus 000 Recital Attendance	0
Mus 125 Ensemble (Major)	½	Mus 125 Ensemble (Major)	½
Med 351 Teaching of Sec. Choral Music*	2	Med 254-257 Instrumental Methods*	2
Med 352 Teaching of Sec. Instr. Music*	2	Mus 400 Applied Performance (Major)	2
Mus 400 Applied Performance (Major)	2	Mus 401 Recital	0
Med 360 Intern Teaching in Music	11	Distribution Requirements	9
		Free Elective	3
	17½		16½

*Accelerated courses.

Recommended Course Sequence for Bachelor of Music — Music Education Major

Instrumental Track (with certification)

Program completed with 134 semester credits.

First Semester		Second Semester	
Mus 000 Recital Attendance	0	Mus 000 Recital Attendance	0
Mus 010 Functional Piano	0	Mus 010 Functional Piano	0
Mus 100 Applied Performance (Major)	2	Mus 100 Applied Performance (Major)	2
Mus 103 Comp. Musicianship I	2	Mus 104 Comp. Musicianship II	2
Mus 105 Harmonic Foundations I	3	Mus 106 Harmonic Foundations II	3
Mus 107 Historical Analysis of Music I	3	Mus 108 Historical Analysis of Music	3
Mus 121 or 131 Ensemble (Major)	½	Mus 121 or 131 Ensemble (Major)	½
Mus 125 Ensemble (Minor)	½	Mus 125 Ensemble (Minor)	½
Eng 101 Composition	3	Eng 102 Composition	3
Distribution Requirement	3	Distribution Requirement	3
PE 100 Activity	0	PE 100 Activity	0
	17		17

Third Semester		Fourth Semester	
Mus 000 Recital Attendance	0	Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Major)	½	Mus 121 or 131 Ensemble (Major)	½
Mus 125 Ensemble (Minor)	½	Mus 125 Ensemble (Minor)	½
Mus 200 Applied Performance (Major)	1	Mus 200 Applied Performance (Major)	1
Mus 200 Applied Performance (Minor)	1	Mus 200 Applied Performance (Minor)	1
Mus 203 Comp. Musicianship III	2	Mus 204 Comp. Musicianship IV	2
Mus 205 Harmonic Foundations III	3	Mus 206 Harmonic Foundations IV	3
Mus 207 Historical Analysis of Music III	3	Mus 208 Historical Analysis of Music IV	3
Mus 260 Conducting I	2	Mus 255 Instrumental Methods	2
Med 011 Functional Guitar*	0	Mus 262 Instrumental Conducting II	2
Med 254 Instrumental Methods	2	Med 011 Functional Guitar*	0
Psy 101 General Psychology	3	Distribution Requirement	3
	18		18

*If elementary or general music concentration.

Fifth Semester		Sixth Semester	
Mus 000 Recital Attendance	0	Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Major)	½	Mus 121 or 131 Ensemble (Major)	½
Mus 256 Instrumental Methods	2	Mus 257 Instrumental Methods	2
Mus 300 Applied Performance (Major)	1	Mus 300 Applied Performance (Major)	1
Mus 300 Applied Performance (Minor)	1	Mus 300 Applied Performance (Minor)	1
Med 250 Teaching of Elementary Music	2	Med 202 Practicum in Music Education	1
Ed 201 Effective Teaching	3	Med 252 Teaching of General Music	2
Distribution Requirements	6	Ed 202 Educational Psychology	3
		Distribution Requirements	6
	15½		16½

Seventh Semester		Eighth Semester	
Mus 000 Recital Attendance	0	Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Major)	½	Mus 121 or 131 Ensemble (Major)*	½
Mus 400 Applied Performance (Major)	2	Mus 400 Applied Performance (Major)	2
Med 351 Teaching of Sec. Choral Music*	2	Mus 401 Recital	0
Med 352 Teaching of Sec. Instr. Music*	2	Distribution Requirements	9
Med 360 Intern Teaching in Music	11	Free Elective	3
	17½		14½

*Accelerated courses.

Music

MUS 000. RECITAL ATTENDANCE **No credit**

This course is required each semester for all music majors. Degree requirement for graduation.

MUS 010. FUNCTIONAL PIANO **No credit**

Class instruction in piano for music majors. Competency must be passed through examination before eligibility to upperclass status. Class meets two hours per week.

Prerequisite: none.

MUS 100-400. APPLIED PERFORMANCE **One credit or two credits**

Instruction offered in all keyboard, band and orchestral instruments, guitar and voice. Individual instruction. For non-music and music majors. Each area conducts a weekly master class for discussion and performance. Participation is required.

Prerequisite: Consent of instructor.

MUS 100. Freshman Level
MUS 200. Sophomore Level
MUS 300. Junior Level
MUS 400. Senior Level
MUS 301. Junior Recital — No credit
MUS 401. Senior Recital — No credit

Section A	Flute	Section H	French Horn
Section B	Clarinet	Section I	Voice
Section C	Oboe	Section J	Baritone Horn
Section D	Bassoon	Section K	Trombone
Section F	Saxophone	Section L	Tuba
Section G	Trumpet	Section M	Violin

Section N	Viola	Section U	Organ
Section O	Cello	Section V	Guitar
Section P	Bass	Section X, Y	Voice
Section Q	Percussion	Section Z	Harp
Section R, S, T	Piano		

MUS 101. INTRODUCTION TO MUSIC I **Three credits**
The materials of music and their interrelationships. Illustrations are derived from literature of all periods for the purpose of developing understanding and enjoyment through perceptive listening.

MUS 102. INTRODUCTION TO MUSIC II **Three credits**
A survey of performance literature extending from the 17th century to the present. Directed listening of various idioms, forms, and styles characteristic of each period. The purpose is to stimulate critical judgment.

Prerequisite: Mus 101 or consent of instructor.

MUS 103-104, 203-204 COMPREHENSIVE MUSICIANSHIP I-IV **Two credits**
A degree requirement. Intensive training in basic skills through ear-training, rhythmic, melodic and harmonic dictation, keyboard harmony, and aural analysis using modal, tonal and post-tonal compositions. Competency must be demonstrated before entrance into the junior class.

Corequisite: To be taken in sequence with Harmonic Foundations and the Analysis of Music (for all Music majors) or consent of instructor.

MUS 105-106, 205-206. HARMONIC FOUNDATIONS I-IV **Three credits**
A degree requirement. A study of the functions, structures, and elements of music, modal through post-tonal styles. Written exercises and in-depth examination of musical examples.

Corequisite: To be taken in sequence with Comprehensive Musicianship and the Analysis of Music (for all Music majors) or consent of instructor.

MUS 107-108, 207-208. HISTORICAL ANALYSIS OF MUSIC I-IV **Three credits**
A degree requirement. In-depth studies of the historical evolution of musical styles, antiquity to the present, through class lectures, analysis of the literature, and performance practices.

Corequisite: To be taken in sequence with Comprehensive Musicianship and Harmonic Foundations (for all Music majors) or consent of instructor.

MUS 111-112. CLASS PIANO I-II **Two credits**
Class instruction in piano. A two-semester sequence designed to provide non-music majors with a rudimentary study of piano performance. The classes will be divided into small sections according to proficiency level.

Prerequisite: None.

MUS 121. WIND ENSEMBLE **One-half credit**
Open to all members of the College community, by audition. A select organization of wind, brass, and percussion players that performs the best of the tradition Concert Band repertory, along with contemporary music for wind ensemble.

MUS 125. CHORUS **One-half credit**
The Chorus offers students the opportunity to learn and perform a wide range of sacred and secular choral music. Open to all college students. Anyone desiring to sing in the chorus should consult with the director. Participation required of all music majors.

MUS 126. CAP AND BELL SINGERS **One-half credit**
Membership is limited to a small group of selected singers who learn and perform solo and ensemble pieces from the literature of opera, operetta, and musical theatre.

MUS 127. JAZZ ENSEMBLE **One-half credit**
Open to all members of the College community, by audition. The ensemble rehearses and presents frequent performances of literature encompassing a wide range of jazz styles and techniques.

MUS 128. CHAMBER PERFORMANCE **One credit**
Participation required of all applied performance majors for a minimum of three semesters. Students will study and publicly perform chamber literature appropriate to their instruments. Coaching and supervision by faculty members, as assigned.

Prerequisites: Mus 200, junior standing, or consent of instructor.

MUS 131. UNIVERSITY ORCHESTRA **One-half credit**
Open to all members of the College community, by audition. The orchestra performs concerts throughout the year of chamber and symphonic literature. Participation is required of all string applied performance and string music education majors.

MUS 203-204. See Mus 103-104.

MUS 205-206. See Mus 105-106.

MUS 207-208. See Mus 107-108.

MUS 212. KEYBOARD ACCOMPANYING **Two credits**
A study of the techniques concerned with solo, chamber, and group accompanying. Required of all keyboard applied performance majors.

Prerequisites: Mus 101, 103-106.

MUS 213-215. ACCOMPANYING PRACTICUM I-III **One credit**
Practical accompanying experience, as assigned. Minimum time allotment is five hours per week of studio, chamber, or group accompanying, plus public performance accompanying when required.

Prerequisite: Mus 212.

MUS 259. VOICE DICTION **Two credits**
An intensive study of the phonics of English, French, German, and Italian languages, based upon the International Phonetic Alphabet. Practical application is achieved through song literature selected from all historical periods. Required of all voice performance and choral music education majors.

MUS 260-262. CONDUCTING I-III **Two credits**
Through class lectures, demonstrations and laboratory performances, students learn and practice the fundamental techniques of conducting. Score reading and preparation, basic conducting patterns, gestures, and rehearsal methodology will be studied. The emphasis will be on actual laboratory experience.

MUS 260. Introduction to Conducting
MUS 261. Choral Conducting II
MUS 262. Instrumental Conducting II

Prerequisites: Mus 103-108, sophomore standing, or consent of instructor.

MUS 298. TOPICS **Three credits**
A study in topics of special interest not extensively treated in regularly offered courses.

MUS 305. COMPOSITION AND ORCHESTRATION **Two credits**
Practical exercises in composition, orchestration, and arranging for instruments and voices in all combinations, including orchestral, wind, jazz, and chamber ensembles. Required of all Applied Performance majors.

Prerequisites: Mus 206 and 208.

MUS 306. 20th CENTURY THEORY **Two credits**

A survey of twentieth-century theoretical systems emerging from post-romantic and impressionistic to post-serial and avant-garde styles of the contemporary times. Emphasis will be on compositional techniques. Works and writings of Schoenberg, Stravinsky, Hindemith, Babbitt, Sessions, Messaien, Boulez, and others will be examined. Listening and analysis. Required of all Applied Performance majors.

Prerequisites: Mus 204, 206, and 208, junior standing, or consent of instructor.

MUS 307-316. MUSIC PEDAGOGY **Three credits**

A survey of the techniques and methodology concerned with individual teaching of each applied idiom. Required of all applied performance majors. Sections are offered in the following areas:

MUS 307. Voice Pedagogy
MUS 309. Piano Pedagogy
MUS 311. Woodwind Pedagogy
MUS 313. Brass Pedagogy
MUS 315. String Pedagogy
MUS 316. Percussion Pedagogy

Prerequisites: Mus 200, junior standing, or consent of instructor.

MUS 395-396. INDEPENDENT RESEARCH **One to three credits**

Independent study and research for advanced students in music under the direction of a staff member. A research paper at a more substantial level beyond a term paper is required.

Prerequisite: Approval of department chairperson.

MUS 397. SEMINAR **One to three credits**

Presentation and discussion of selected topics.

Prerequisite: Approval of department chairperson.

MUS 399. COOPERATIVE EDUCATION **One to six credits**

Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

MUS 407-415. MUSIC LITERATURE **Three credits**

An examination of the literature, its style and technical problems, studied through performance coaching. These courses are designed to give the student a comprehensive knowledge of the literature for each respective major area of performance. They will provide a necessary foundation for performance practice requirements beyond the scope of only a lecture approach. Sections are offered in the following areas:

MUS 407. Voice Literature
MUS 408. Choral Literature
MUS 409. Keyboard Literature
MUS 410. Chamber Literature
MUS 411. Orchestral Literature
MUS 412. Woodwind Literature
MUS 413. Brass Literature
MUS 414. String Literature
MUS 415. Percussion Literature

Prerequisites: Mus 205-208, senior standing in music, or consent of instructor.

Music Education

MED 011. FUNCTIONAL GUITAR **No credit**

Class instruction in guitar. Required for all choral, elementary, or general music specialists. Competency must be passed through examination before eligibility to upperclass status. Class meets two hours per week.

MED 202. PRACTICUM IN MUSIC EDUCATION **One credit**

MED 202 provides students with field experiences that are specific to the field of music education. This is the student's second practicum.

Prerequisite: Ed 201; junior standing.

MED 250. TEACHING OF ELEMENTARY MUSIC **Two credits**

A study of the newer practices in elementary music — Suzuki, Orff, Kodaly, and Dalcroze. Emphasis on the development of skills and techniques of physical movement, improvisation, solfeggio, tone-bar and mallet technique, recorder playing, folk dancing, composition of suitable materials for classroom use, arranging and adapting existing music for the Orff instrumentarium. A survey and evaluation of appropriate resource materials.

MED 252. TEACHING OF GENERAL MUSIC **Two credits**

A study of the contemporary approaches to teaching of general music in junior and senior high schools, such as creativeness and musical skill concepts through an extension of Orff, Kodaly, and others.

Prerequisite: Med 250.

MED 254-258. MUSIC METHODS **Two credits**

An examination, discussion and practical application of the methodology necessary for the students to learn the techniques of group performance in the principal instrumental and vocal areas. This sequence of courses provides the student with a minimum competency in the group performance techniques of each instrumental idiom. This exposure reinforces the technical concentration beyond the student's major applied instrument. Required of all music education students.

MED 254. Woodwinds Methods
MED 255. Brass Methods
MED 256. String Methods
MED 257. Percussion Methods
MED 258. Vocal Methods

Prerequisites: Mus 100, 103-106, sophomore standing, or consent of instructor.

MED 351. TEACHING OF SECONDARY CHORAL MUSIC **Two credits**

An examination of the administration and logistics of a secondary choral music program. A systematic development of teaching and rehearsal techniques, planning, and evaluation.

Prerequisites: Med 250, 252, Mus 260 and 261, junior standing, or consent of instructor.

MED 352. TEACHING OF SECONDARY INSTRUMENTAL MUSIC **Two credits**

An examination of the administration and logistics of a secondary instrumental music program. A systematic development of teaching and rehearsal techniques, planning, and evaluation.

Prerequisites: Med 250, 252, Mus 260 and 262, junior standing, or consent of instructor.

MED 360. INTERN TEACHING IN MUSIC **Eleven credits**

Students are assigned to cooperating teachers in area schools. Students assume responsibilities for teaching under supervision. Observation and evaluation are the responsibility of the University Music Faculty. Students must provide their own transportation. Approval required.

NURSING

Associate Professor Kolanowski, Chairperson; Associate Professors Bohlander, Castor, Druffner, Grabo, Saueraker, Schreiber, Telban, Zack; Assistant Professors Merrigan, Zielinski; Adjunct Faculty Babcock, Craig.

Total minimum number of credits required for a major in Nursing leading to the B.S. degree — 129.

Philosophy and Curriculum

The practice of professional nursing is a deliberative process of assessing, analyzing, planning, implementing, and evaluating care with clients which promotes and restores health and prevents illness. The baccalaureate program prepares a beginning, self-directed practitioner who is capable of initiating, implementing, and revising nursing care.

Professional nursing is based upon the integration of knowledge from the humanities, the physical and social sciences, nursing theories and research. The curriculum is based on the development of the individual throughout the life cycle.

The curriculum flows from the philosophy and covers a four-year academic period. It includes integrated nursing courses, electives and the general core requirements. Due to the cultural diversity of clients, it is suggested that students consider taking a foreign language. Written agreements with the cooperating hospitals and agencies in Northeastern Pennsylvania ensure clinical facilities for the student's practice, which is concurrent with the classroom theory. Cooperating agencies which are used for student practice are listed in the Nursing Student Handbook. **(STUDENTS ARE RESPONSIBLE FOR THEIR OWN TRANSPORTATION TO ASSIGNED CLINICAL AREAS.)**

In addition, opportunities for learning are provided in the Learning Resource Center, which is equipped with electronic study carrels and audio-visual instructional materials. A simulated hospital environment allows the student to practice the psychomotor skills necessary in nursing practice. A faculty member is available to assist the students.

Advanced Placement

The Department of Nursing provides advanced credit examinations for applicants to enter the program at their level of competency. Previous education and/or practical experience which would involve repetitive learning justify advancing the applicant to higher level responsibilities.

Transfer and registered nurse students are required to have a personal interview with the department chairperson or her designee to plan their program before they can be accepted into the Wilkes nursing program.

Registered nurse students and students who have completed a program of study and are eligible to sit for NCLEX-RN are required to complete N299

and successfully pass a comprehensive examination for validation of prior learning. When these two requirements are met, credit will be awarded for N202, N203 and N204.

Specific Requirements for the Nursing Program

Students majoring in Nursing are required to have completed courses in English (4 units), Social Studies (three units), Mathematics (two units including Algebra), and Science (two units including Biology and Chemistry) during their secondary school program.

The student of nursing assumes all the financial obligations listed in the section on fees in this Bulletin. Additional expenses incurred in the nursing program are listed in the Nursing Student Handbook. A price list for the above items may be obtained at the Department of Nursing.

Students must obtain from the Department Secretary, early each May, the appropriate health examination forms to be completed and returned to the Department of Nursing by August 1st. Students should read the form carefully and be sure it is completed before returning it. Failure to have all examinations completed and documented by August 1st results in a $50 late fee.

Nursing courses are introduced in the sophomore year. Satisfactory clinical performance is an essential component of each nursing course. A grade of 2.00 is required in **all** clinical nursing courses to progress through the program. A student may repeat one nursing course without prejudice. A subsequent failure of any clinical nursing course is deemed sufficient cause for dismissal from the program.

A student may be required to submit, at any time, to a health evaluation by the University physician, or nurse practitioner, if evident limitations interfere with the student's practice or learning.

In addition to fulfilling the academic requirements of the University, students majoring in nursing are required to complete the comprehensive examination and required studies as assigned by the Department of Nursing before being eligible to graduate.

License to Practice

Candidates for a license to practice in the health field are required to have "good moral character." The Pennsylvania State Board of Nursing takes into consideration, when deciding on the applications for registration and a license to practice under their jurisdiction, whether candidates have been convicted of any felony or misdemeanor. Candidates are referred to the regulations specified in the Professional Nurse Law (P.L. 317, No. 69).

THE DEPARTMENT OF NURSING FACULTY RESERVES THE RIGHT TO REVISE THE NURSING MAJOR REQUIREMENTS AS DEEMED NECESSARY AT ANY TIME TO PREPARE STUDENTS FOR NEW AND EMERGING ROLES IN NURSING.

Recommended Course Sequence for a Major in Nursing

First Semester		Second Semester	
Bio 115 Human Anatomy and Physiology I	4	Bio 113 Microbiology	4
Eng 101 Composition I	3	Bio 116 Human Anatomy and Physiology II	4
Psy 101 General Psychology or Soc 101 Intro. to Sociology or Ant 101 Intro. to Anthropology*	3	Eng 102 Composition II	3
Distribution Requirement	3	Psy 101 General Psychology or Soc 101 Intro. to Sociology or Ant 101 Intro. to Anthropology*	3
PE 100 Activity	0	Distribution Requirement or Soc 251	3
	13	PE 100 Activity	0
		Mth Competency**	0
			17

Third Semester		Fourth Semester	
Nsg 200 Nutrition	3	Nsg 202 Nursing Care of the Young Client	8
Nsg 201 Principles of Nursing	6	GES 240 Environmental Science	4
Soc 251 Sociology of Minorities or Distribution Requirement	3	Psy Elective	3
Phy Physical Sciences	4		15
	16		

Fifth Semester		Sixth Semester	
Nsg 203 Nursing Care of the Adult Client	8	Nsg 204 Nursing Care of the Adult Client II	8
Mth 150 Elementary Stats***	3	Elective	3
Distribution Requirements	6	Distribution Requirements	6
	17		17

Seventh Semester		Eighth Semester	
Nsg 301 Nursing Care of the Older Adult Client	8	Nsg 302 Senior Practicum	8
Nsg 305 Intro. to Nursing Research	3	Nsg 303 Contemporary Issues in Nursing	3
Electives	6	Electives	6
	17		17

*Please note students must take both Psy 101 and Soc/Ant 101 during their freshman year.
**Math competency must be obtained during the freshman year. It is a prerequisite to Nsg 201.
***Please note: Math 150 is required and prerequisite to Nsg 305.

NSG 200. PRINCIPLES OF NORMAL NUTRITION **Three credits**
An introduction of the basic science of human nutrition; principles of normal nutrition, meal planning, computation of diets, physiological, psychosocial, and social effects of food and its constituents; and some contemporary local, national, and international nutrition problems.
Prerequisite: Chm 130.
Corequisite: Nsg 201.

NSG 201. PRINCIPLES OF NURSING **Six credits**
This course introduces the concepts of client, basic human needs, accountability, development, health status, nursing process, nursing leadership, and research. Use of the nursing process is emphasized in meeting the basic health care needs of clients. Instruction in the Nursing Learning Center and selected clinical agencies constitutes the laboratory component. Hours weekly: 4 hours class, 1 hour discussion, 3 hours clinical practice. Placement: third semester. Fee: $80.
Prerequisites: Bio 113, Bio 116, Psy 101, Soc 101, Mth competency.
Corequisites: Nsg 200, Phy, Soc 251.

NSG 202. NURSING CARE OF THE YOUNG CLIENT **Eight credits**
Basic concepts introduced in Nsg 201 are utilized in assisting young clients to meet their health needs during childbearing and childrearing years. Theory is concurrent with practice in select health care settings including community agencies. Hours weekly: 4 hours class, 12 hours clinical practice. Fee: $80.
Prerequisites: Nsg 200, 201.

NSG 203. NURSING CARE OF THE ADULT CLIENT I **Eight credits**
The nursing process is utilized in assisting adult clients to maintain optimum wellness and to resolve selected health problems. Nursing theory as related to the biopsychosocial aspects of adult care is correlated with clinical practice in a variety of health care settings. Continuity of care is emphasized in the clinical component. Relevant findings from nursing research are incorporated. Hours weekly: 4 hours class, 12 hours clinical practice. Fee: $80.
Prerequisite: Nsg 202.

NSG 204. NURSING CARE OF THE ADULT CLIENT II **Eight credits**
The nursing process is utilized in assisting adult clients to maintain optimum wellness and to resolve selected medical, surgical, and mental health problems. Nursing theory as related to the biopsychosocial aspects of adult care is correlated with clinical practice in a variety of health care settings. Continuity of care is emphasized in the clinical component. Relevant findings from nursing research are incorporated. Hours weekly: 4 hours class, 12 hours clinical practice. Fee: $80.
Prerequisite: Nsg 203.

NSG 270. RECENT TRENDS IN CLINICAL NUTRITION **Three credits**
This elective course is an introduction to diet therapy, with a discussion of the contemporary issues in clinical nutrition. Deals with the popular myths about nutrition and health and substantiates or refutes these claims with research evidence.
Prerequisite: Nsg 200 or RN status.

NSG 271. HEALTH CARE TERMINOLOGY **One credit**
Word derivations, roots, prefixes, and suffixes are studied in an attempt to enable students to understand and communicate in terminology common to the health care professions. The emphasis will be on understanding the language in context rather than memorization of unrelated terms.

NSG 272. CLINICAL APPLICATION OF PHARMACOLOGY **Three credits**
This elective course is designed to expand the student's knowledge of pharmacology. It includes the pharmocologic effect of drugs on body systems, as well as the interaction of multiple drugs and environmental factors.
Prerequisites: Junior and Senior Nursing students and Registered Nurses.

NSG 273. PHYSICAL ASSESSMENT **Three credits**
This elective course is designed to facilitate the integration of physical assessment skills as an essential element of the nursing process. The components of physical assessment, including the health history and physical examination, are organized to allow the student to proceed from an assessment of the overall functions of a client to the more specific functions of each body system. The evaluation of the health status of individuals is expanded to include more complex assessment skills as well as modifications for the elderly and pediatric client.

Prerequisites: Junior and Senior Nursing majors or RN students.

NSG 299. NURSING FORUM I **Six credits**
This course is designed to facilitate the transition of Registered Nurse students from other educational routes into baccalaureate nursing education. The course explores the concepts of client basic human needs, development, accountability, health status, nursing process, nursing leadership and research. Use of the nursing process is emphasized in assisting a variety of clients to maintain optimum level wellness. Nursing theory as related to the biological, psychological, and social aspects of client health is correlated with clinical practice in a variety of health care settings. Hours weekly: 5 hours class, 3 hours clinical practice. Fee: $80.

Prerequisites: RN status or NCLEX eligibility, Eng 101-102.

NSG 301. NURSING CARE OF THE OLDER ADULT CLIENT **Eight credits**
The nursing process is utilized in the care of the older adult client. Topics have been chosen which reflect the normative changes accompanying the aging process as well as the interactive effects of multiple biological, psychological, and social problems. Clinical practice, emphasizing disease prevention, health promotion, maintenance and restoration, in long-term care settings, is correlated with theory presentation. Hours weekly: 4 hours class, 12 hours clinical practice. Fee: $80.

Prerequisite: Nsg 204.

NSG 302. SENIOR PRACTICUM **Eight credits**
Explores current nursing theories and models of practice, and develops the concepts of leadership, management, and organizational change. The student synthesizes knowledge from all previous nursing and supportive courses in an area of clinical practice consistent with career goals and contingent upon availability of clinical placement and approval of the Level Coordinator. Hours weekly: 2 hours class, 18 hours clinical practice in a variety of settings. Fee: $80.

Prerequisites: Nsg 301.

NSG 303. CONTEMPORARY ISSUES IN NURSING **Three credits**
This course examines the influences on the role and functioning of the professional nurse. Current issues and long-term trends are analyzed for their effects on nursing and health care. The nursing profession is studied, using formats which foster critical thinking and communication skills. Major emphasis is placed on nursing as an independent health-care profession; interdependent and collaborative relationships with other health professions are also examined.

Prerequisite: Nsg 204.

NSG 305. INTRODUCTION TO NURSING RESEARCH **Three credits**
An introduction to the study of the research process. Emphasis will be on studies in nursing. It will provide a foundation for critically evaluating research reports and applying research findings to practice. (Taught summer and fall only)

Prerequisites: Nsg 204, Mth 150.

NSG 395-396. INDEPENDENT STUDY **One to three credits**
Independent study for advanced students in nursing under the direction of a staff member.

Prerequisites: By arrangement with an instructor. Candidates for independent study must have a minimum cumulative and nursing G.P.A. of 3.00 and be of senior class standing.

NSG 399. COOPERATIVE EDUCATION **One to six credits**
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

NSG 198/298/398. TOPICS IN NURSING **Variable credit**
A study in topics of special interest that are not exclusively treated in regularly offered courses.



PHARMACY

Dean and Professor: Dr. Umid R. Nejib; Advisory Team: Dr. Jack R. Cole, Professor of Pharmacy, University of Arizona; Dr. James T. Doluisio, Dean, University of Texas at Austin College of Pharmacy; Mrs. Patricia C. Kienle, Director of Pharmacy Services, Mercy Hospital, Wilkes-Barre; Dr. Louis A. Luzzi, Dean, University of Rhode Island College of Pharmacy; Dr. Ronald W. MacLean, Interim President and Dean, Albany College of Pharmacy; Dr. Ronald Maddox, Dean, Campbell University College of Pharmacy; Mr. John A. Mariani, Pharmacy Supervisor, CVS Pharmacies and Chair, Pennsylvania Board of Pharmacy; Dr. William F. Raub, Science Advisor to the EPA Administrator; Dr. Sidney A. Rosenbluth, Dean, West Virginia University School of Pharmacy; Dr. Paul A. Wender, Professor of Chemistry, Stanford University; Mr. Wayne P. Yetter, President, Astra/Merck Group of Merck and Co., Inc.

The start of the 1994 academic year signifies the implementation of Pre-Pharmacy curriculum as the first step toward initiating the Doctor of Pharmacy program at Wilkes. This initiative, leading to the Pharm.D. degree, is a 2 year pre-pharmacy + 4 year pharmacy program. The Pharmacy Program will prepare students to satisfy state licensure requirements and also to develop hands-on pharmaceutical skills and business savvy in order to function as 21st century pharmacists.

The curriculum aims to develop meaningful interpersonal, investigative, experimental, business, and computer skills through classroom instruction, the use of modern techniques, and in-depth clinical experience and clerkships (the hallmark of the program). Upon graduation, students can select pharmacy careers in such areas as drug store and patient-centered pharmacy practice, graduate education, or the pharmaceutical industry.

To successfully complete the pre-professional studies, students must complete a minimum of two years of pre-pharmacy education, including courses in the sciences and the humanities. The program is augmented by various electives, which allow students to personalize this unique degree program.

The four-year professional curriculum is comprised of two years of Pharmaceutical Sciences followed by two years of hands-on education and training in various facets of Pharmacy Practice. The curriculum provides opportunities for various specializations and clerkships, including team clerkships (Alliance Approach). A special appreach to the clinical years will include clerkships in rural areas and small towns, two areas where pharmacists will be needed most at the end of this decade and beyond.

To enter the Doctor of Pharmacy program, students must first be admitted to the University. Each of the Pharmacy admission requirements (see the following), in addition to the nature of high school course work, is then weighted separately and considered collectively in order to develop a realistic portrait of the applicant.

The accreditation process has been initiated and the University is committed to successfully pursue full accreditation with the American Council on Pharmaceutical Education (ACPE). The American Association of Colleges of Pharmacy (AACP) has accepted Wilkes University as an affiliate institutional member.

Pre-Pharmacy Minimum Admission Requirements
enrollment limit: 80

Applicant must:
- be a graduate of an accredited high school or academy
- rank in the upper half of the class
- have attained an SAT minimum of 950
- submit two teacher recommendations.

Pharmacy Minimum Admission Requirements
enrollment limit: 65

Applicant must:
- have completed the pre-pharmacy curriculum at Wilkes with a minimum GPA of 2.50 or at any accredited college or university in the USA with a minimum GPA of 2.75
- provide two recommendations from pre-pharmacy faculty
- complete an interview.

Applicant has the option to:
- submit a pharmacist's recommendation
- complete the Pharmacy College Admission Test (PCAT) as an added preference.

Early Admission Program Minimum Requirements

Early admission to the pharmacy component of the program is granted to students with strong high school credentials who maintain a high GPA. Students will be eligible for consideration for this program if they:
- rank in the top 15% of their high school classes
- have attained an SAT total of at least 1050
- supply two faculty recommendations
- have a successful interview.

NOTE: These students must then complete the Wilkes pre-pharmacy curriculum with a minimum 3.0 GPA.

Recommended Course Sequence for Pre-Pharmacy*

First Semester		Second Semester	
Eng 101 Composition I	3	Eng 102 Composition II	3
Bio 121 Principles of Modern Biology I	4	Bio 122 Principles of Modern Biology II	4
Chm 115 Elements and Compounds	4	Chm 116 The Chemical Reaction	4
SSE 107 Technological Survival/ Introduction to Pharmacy	3	PE 100 Activity	0
PE 100 Activity	0	Electives**	6
Elective**	3		17
	17		

*Most of the requirements may be satisfied via satisfactory achievement on advanced placement tests or Wilkes's Challenge exams.

**Elective courses (15 credits) are selected in consultation with the advisor. They may include, for example: Accounting, Art, Business, English, the Environment, Ethics, History, Language, Literature, Music, Psychology, Sociology, etc.

Third Semester		Fourth Semester	
Chm 231 Organic Chemistry I	4	Chm 232 Organic Chemistry II	4
COM 101 Fundamentals of Speech	3	CS 298 Computer/Informatics	3
Ec 101 Principles of Economics I	3	Phy 171 Introductory Physics I	4
Mth 105 Calculus for Life, Managerial, and Social Sciences I	4	Mth 150 Elementary Statistics	3
Elective**	3	Elective**	3
	17		17

**Elective courses (15 credits) are selected in consultation with the advisor. They may include, for example: Accounting, Art, Business, English, the Environment, Ethics, History, Language, Literature, Music, Psychology, Sociology, etc.

PHILOSOPHY

Assistant Professor Paul, Chairperson; Professor Emeritus Williams; Professor Kay; Assistant Professor Jacoby.

Total minimum number of credits required for a major in Philosophy leading to the B.A. degree — 120.
Total minimum number of credits required for a minor — 18.

The study of philosophy, whether by those who pursue a major in philosophy or by those who elect only a few courses of special interest, contributes to the development of the most basic skills and habits of mind which are characteristic of educated men and women: clarity of thought, precision in the analysis of conflicting claims, the power to render sound judgments based upon an appreciation of differing perspectives, and the ability to express and defend one's own views with force and imagination. Students who develop these skills through the study of philosophy are prepared for a variety of professional careers in law, medicine, teaching, and the ministry. In addition, they are the beneficiaries of the traditional liberal arts education as a preparation for numerous careers in government, business, and industry. It is recommended that students who major in Philosophy take a foreign language.

Since students may elect to pursue a double major in philosophy and a related area of interest, philosophy majors are invited to design their own majors in consultation with their advisors and with the approval of the department chairperson. The typical program consists of 30 credit hours in philosophy, including Phl 101, Phl 122, and Phl 201.

The minor in philosophy consists of 18 credit hours, including Phl 101 (3 credit hours), Phl 122 (3 credit hours), and either Phl 201 or 202 (3 credit hours).

Recommended Course Sequence for a Major in Philosophy

First Semester		Second Semester	
Eng 101 Composition I	3	Eng 102 Composition II	3
Phl 101 Introduction to Philosophy	3	Phl 122 Introduction to Logic	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15		15

Third Semester		Fourth Semester	
Major Elective	3	Major Elective	3
Distribution Requirements	6	Distribution Requirement	3
Free Electives	6	Free Electives	9
	15		15

Fifth Semester		Sixth Semester	
Major Electives	3	Major Electives	3
Distribution Requirement	3	Distribution Requirement	3
Free Electives	9	Free Electives	9
	15		15

Seventh Semester		Eighth Semester	
Major Electives	6	Major Electives	6
Free Electives	9	Free Electives	9
	15		15

PHL 101. INTRODUCTION TO PHILOSOPHY **Three credits**
An introduction to the major figures, problems, and concerns of Western philosophical thought. Students in this course typically examine a variety of philosophical questions and problems such as: the existence of God, human nature and the good life, fatalism, freedom, and responsibility, skepticism and the nature of knowledge, and theories of reality.

PHL 110. INTRODUCTION TO ETHICAL PROBLEMS **Three credits**
An exploration of a series of basic ethical problems. Topics to be covered include basic ethical theories, how to evaluate ethical theories and moral arguments, the relationship between religion and ethics, and a selection of current moral problems such as abortion, capital punishment, affirmative action, animal rights, etc. Specific moral problems covered will vary. Other ethical questions such as "How should we live?" may also be covered in the course.

PHL 120. CRITICAL THINKING **Three credits**
An introduction to informal logic. Recognition and evaluation of arguments; distinguishing fallacies from general rules of inference; causal reasoning; and the application of reasoning skills in related areas, such as science or law.

PHL 122. INTRODUCTION TO SYMBOLIC LOGIC **Three credits**
An introduction to the nature of logical systems and deductive reasoning. The study of the syntax and semantics of formal languages; testing arguments for validity; and an examination of other important logical notions, such as proof and consistency.

PHL 201. ORIGINS OF WESTERN THOUGHT **Three credits**
The development of Western philosophical thought from its beginnings in the Greek world to early Christian thought. Philosophers to be studied include the Pre-socratics, Plato, Aristotle, Plotinus, the Stoics, Epicurus, Sextus Empiricus, and St. Augustine.

PHL 202. MODERN PHILOSOPHY: DESCARTES TO KANT **Three credits**
Western philosophical thought from the Renaissance to the end of the eighteenth century, including the writings of Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant.
Prerequisite: Phl 101 or 201 or permission of instructor.

PHL 210. ETHICAL THEORY **Three credits**
A study of classical and contemporary ethical theories, the problems that they raise and the problems they are intended to solve. The theories of Plato, Aristotle, Kant, Hume, and Mill will be examined as well as more recent contributions by Ross, Harman, Moore, Ayer, Stevenson, and Hare. Questions addressing ethical relativism, the relationship of religion to ethics, skepticism, moral realism, egoism, and value judgments will also be discussed.
Prerequisite: Phl 101 or permission of instructor.

PHL 212. BUSINESS ETHICS **Three credits**
An enquiry into the ethical issues that arise in the context of business. Major ethical theories such as those of Bentham, Mill, Kant, and Ross are examined in such areas of concern as discrimination in the work place, testing and employee privacy, consumer deception, and environmental issues. Theories of justice such as those of Nozick and Rawls are used to clarify such problems as corporate responsibility in plant relocation and overall economic justice.
Prerequisite: Phl 101 or permission of instructor.

PHL 214. MEDICAL ETHICS **Three credits**
A selection of important issues facing health care providers, patients and society in general are examined. Topics include euthanasia, abortion, doctor-patient relationships, the use and misuse of information, research on human and non-human animals, informed consent, patients' rights, truthfulness and the right to know, conflicts of obligations, the right to health care, the allocation of resources, mandatory testing for AIDS, and the use of genetic and reproductive technologies.
Prerequisite: Phl 101 or permission of instructor.

PHL 230. SOCIAL AND POLITICAL PHILOSOPHY **Three credits**
Social and political institutions as seen by such classic critics as Plato, Aristotle, Hobbes, Locke, Hume, Rousseau, Bentham, and others. More recent views such as those of Marx, Rawls, and Nozick will also be covered. Special attention is paid to the related questions of the role of the state and the relationship between the individual and the state.
Prerequisite: Phl 101 or permission of instructor.

PHL 232. PHILOSOPHY OF HISTORY **Three credits**
A study of the various interpretations of history. The views of Augustine, Vico, Rousseau, Kant, Hegel, Marx, Comte, Spengler, Schweitzer, Toynbee, Sorokin, Niebuhr, and others on the meaning of historical events.
Prerequisite: Phl 101 or permission of instructor.

PHL 234. PHILOSOPHY OF LAW **Three credits**
A careful examination of the main philosophical issues in the area of jurisprudence such as the nature and validity of law, the purpose of law, and how law is to be enforced. A study of major court rulings will reveal the complex nature of legal reasoning, involving the issues of the place of *mens rea* and responsibility in court decisions. Among the major philosophers that will be studied are Aquinas, Austin, Kelsen, Hart, and Dworkin.
Prerequisite: Phl 101 or permission of instructor.

PHL 240. PHILOSOPHY OF ART **Three credits**
A critical examination of the basic assumptions involved with art. These will include such issues as what constitutes a work of art, what is the purpose of art, the relationship, if any, between art and truth, and what is so-called artistic creativity. A wide range of aesthetic views will be evaluated ranging from those of Plato and Aristotle to the more recent ones of Tolstoy, Bell, Hampshire, and Kennick.
Prerequisite: Phl 101 or permission of instructor.

PHL 250. PHILOSOPHY OF SCIENCE **Three credits**
A critical examination of various issues concerning scientific thought. Topics may include the nature of science, distinguishing science from pseudo-science, the nature of theories, scientific explanation, space and time, causality, the problem of induction, laws of nature, and the reality of theoretical entities.
Prerequisite: Phl 101 or permission of instructor.

PHL 272. PHILOSOPHY OF RELIGION **Three credits**
An examination of various problems that arise when religion is made the object of philosophical reflection: the nature and forms of religious experience, the relationship between faith and reason, arguments for the existence of God, the problem of evil, arguments for immortality, the concepts of worship and miracle, the nature of religious language, and the possibility of religious knowledge.
Prerequisite: Phl 101 or permission of instructor.

PHL 298. TOPICS **Three credits**
The study of a topic of special interest not extensively treated in other courses. Topics chosen according to interest of instructor. Because of its variable content, this course may be repeated for credit.
Prerequisite: Phl 101 or permission of instructor.

PHL 301. STUDIES IN GREEK PHILOSOPHY **Three credits**
A critical examination of a single major philosopher or text from the period of classical Greek philosophy. Because of its variable content, this course may be repeated for credit.
Prerequisite: Phl 201 or permission of instructor.

PHL 302. STUDIES IN MODERN PHILOSOPHY **Three credits**
A critical examination of a single major philosopher or text in the modern period from Descartes to Kant. Variable content: this course may be repeated for credit.
Prerequisite: Phl 202 or permission of instructor.

PHL 304. TWENTIETH CENTURY ANALYTIC PHILOSOPHY **Three credits**
Major figures and movements in analytic philosophy since 1900. Philosophical positions discussed may include logical atomism, logical positivism, ordinary language philosophy, and naturalized epistemology. Philosophers to be studied may include Russell, Frege, Moore, Wittgenstein, Ayer, Carnap, Quine, and Putnam.
Prerequisite: Phl 101 or 120 or 122 or permission of instructor.

PHL 310. STUDIES IN MORAL PHILOSOPHY **Three credits**
An intensive examination of a major ethical theory or a significant problem such as ethical relativism. Because of its variable content, this course may be repeated for credit.
Prerequisite: Phl 210 or permission of instructor.

PHL 316. MORAL PSYCHOLOGY **Three credits**
An analysis of some current questions in moral psychology, an area of philosophy that addresses normative issues regarding human psychology including especially motives, emotions, psychological reactions, etc. Questions to be addressed include questions about moral luck (whether it is possible for an agent to be caught in a situation, through no fault of her own, in

which it is impossible to act rightly), about whether one's moral character may be subject to luck in important ways, about whether there are reasons to act morally if one does not care about reputation or morality, and questions about when judgments of responsibility for actions and character are appropriate.

Prerequisites: Phl 101 or 110 or permission of instructor. Phl 210 is highly recommended.

PHL 322. SYMBOLIC LOGIC **Three credits**

A review of the propositional calculus and a thorough examination of the predicate calculus, including identity, definite descriptions, and relations. Emphasis will be placed upon the concept of a formal system and axiomatization, as well as properties of deductive systems such as consistency, completeness, independence of axioms, and other formal properties.

Prerequisite: Phl 122 or Mth 202 or permission of instructor.

PHL 360. PHILOSOPHY OF MIND **Three credits**

A critical examination of one or more problems concerning the nature of the mind. Possible topics include the traditional mind-body problem, consciousness, intentionality, the self, personal identity, and issues in philosophical psychology.

Prerequisite: Phl 101 or permission of instructor.

PHL 370. METAPHYSICS **Three credits**

A critical examination of one or more problems concerning the nature of reality, dealt with by classical and/or contemporary philosophers. Problems to be considered may include mind and body, space and time, substance, free will, realism and idealism, the existence of God, causality, and the nature of universals.

Prerequisite: Phl 101 or permission of instructor.

PHL 372. ADVANCED PHILOSOPHY OF RELIGION **Three credits**

An intensive examination of a major problem or figure in the philosophy of religion. Because of its variable content, this course may be repeated for credit.

Prerequisite: Phl 272 or permission of instructor.

PHL 380. EXISTENTIALISM **Three credits**

A close examination of the literature of the major existentialist writers, both theistic and atheistic, together with a consideration of its impact upon philosophy, religion, psychology, and art. Special attention will be given to the thought of Kierkegaard, Nietzsche, Jaspers, Heidegger, Marcel, and Sartre.

Prerequisite: Phl 101 or permission of instructor.

PHL 395-396. INDEPENDENT RESEARCH **One to three credits**

Independent study and research for advanced students. A research paper at a level significantly beyond a term paper is required.

Prerequisite: Approval of department chairperson.

PHL 397. SEMINAR **One to three credits**

Presentations and discussions of selected topics.

Prerequisite: Approval of department chairperson is required.

PHL 399. COOPERATIVE EDUCATION **One to six credits**

Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

PHYSICAL EDUCATION

Chairperson Malatesta; Professor Reese; Associate Professors Saracino, Schmidt; Assistant Professor G. Meyers.

The Physical Education Department is viewed as both a vital and integral part of the University's comprehensive educational experience, central to the education of the whole person. The department is committed to maintaining an active role in teaching and promoting wellness and activity courses for students.

Students are required to complete two semesters of Physical Education, each semester being a different learning experience. At least one Physical Education experience must be in a wellness course.

It is recommended that students fulfill their two semesters of Physical Education in the first two years of their program. Exceptions to the Physical Education requirement are made to veterans of the military service who must submit a copy of their honorable discharge from the service to the Registrar's Office, and to students who have medical excuses which are submitted to and verified by the University Health Services and the Registrar.

Students enrolled in AFROTC may substitute AS 101-102-201-212 for the PE 100 series.

PE 101. INTERCOLLEGIATE ATHLETICS **No credit**

This course is limited to students participating in intercollegiate athletics during their sport season. This course may be repeated.

PE 115. WELLNESS WEIGHT TRAINING **No credit**

A wellness course designed to identify physical fitness levels, health risk factors, and lifestyles of students. This course provides instruction in basic techniques of weight training. Individual weight training programs are developed to maintain muscular strength and endurance of the major muscle groups. Students will be required to attend three wellness lectures.

PE 120. BOWLING **No credit**

Designed to teach the basic techniques of bowling; grip, stance, footwork, delivery, and approach to foul line, release and follow through, rules and scorekeeping procedures.

PE 125. BADMINTON **No credit**

This course provides instruction in the fundamental skills of badminton with emphasis on play, rules, and strategy.

PE 130. WELLNESS AEROBIC DANCE **No credit**

A wellness course designed to identify physical fitness levels, health risk factors, and lifestyles of students. The intention of this course is to develop cardiorespiratory conditioning, muscle tone, and muscle strength through high impact dance and exercise movements performed to music. Students will be required to attend three wellness lectures.

PE 131. WELLNESS AEROBIC WALKING **No credit**

A wellness course designed to identify physical fitness levels, health risk factors, and lifestyles of students. The intent of this course is to develop cardiorespiratory conditioning and muscle tone through low impact aerobic activities. Students will be required to attend three wellness lectures.

PE 135. WELLNESS AEROBIC FITNESS — **No credit**
A wellness course designed to identify physical fitness levels, health risk factors, and lifestyles of students. The intent of this course is to provide group programs to achieve cardiorespiratory conditioning, muscle tone, and muscle strength through various aerobic activities. Students will be required to attend three wellness lectures.

PE 136. WELLNESS FITNESS ACTIVITIES — JOGGING — **No credit**
A wellness course designed to identify physical fitness levels, health risk factors, and lifestyles of students. The intent of this course is to develop a self-styled jogging program. Emphasis is placed on warm-up, jogging, and cool-down. Students will be required to attend three wellness lectures.

PE 137. WELLNESS AEROBIC FITNESS — WALKING — **No credit**
A wellness course designed to identify physical fitness levels, health risk factors, and lifestyles of students. The intent of this course is to develop a self-styled walking program. Emphasis is on warm-up, walking, and cool-down. Students will be required to attend three wellness lectures.

PE 140. GETTING STARTED IN GOLF — **No credit**
An indoor activity for the beginning and intermediate golfer, to include the language and equipment of golf, pre-swing fundamentals, in-swing concepts, ball-flight influences, a routine approach to shot execution and swing variations.

PE 145. INDOOR HOCKEY — **No credit**
Designed to teach fundamental skills of indoor hockey and to apply these skills in game situations.

PE 146. INDOOR SOCCER — **No credit**
Designed to teach the fundamental skills of soccer and to apply these skills in game situations.

PE 147. TEAM HANDBALL – MEN — **No credit**
Consists of six field players and a goalie. An aggressive game of throwing, jumping, running, offensive, and defensive moves that develop athletic skills and improve physical fitness.

PE 148. VOLLEYBALL & BASKETBALL – MEN — **No credit**
Elementary skills, terminology, mechanics of offensive and defensive movement, strategy, and rules are developed within team games.

PE 155. TEAM SPORTS — **No credit**
Designed for group participation in team sports activities. Such activities as volleyball, basketball, touch football, or other sports activities may be included.

PE 160. RACQUETBALL — **No credit**
This course teaches fundamental skills of racquetball, strategy, and rules of play. Fee for course.

PE 165. SWIM INSTRUCTION — **No credit**
Water skills, safety, self-reliance, precautions are developed along with swimming stroke instruction.

PE 166. LIFEGUARD TRAINING — **No credit**
This course will be taught under the American Red Cross guidelines for lifeguard certification. All lifesaving water skills will be taught and all written and textbook work will be completed in the course. Those completing and passing the course will not only receive PE credit but lifeguard certification as well. If students prefer only to learn lifesaving skills, they will not have to do the testing for certification.

PE 167. WELLNESS RECREATIONAL SWIMMING — **No credit**
A wellness course designed to identify physical fitness levels, health risk factors, and lifestyles of students. The intent of this course is to develop and maintain fitness components through swimming. Students will be required to attend three wellness lectures.

PE 170. SKIING — **No credit**
This course is designed to give students the opportunity to learn to ski and/or improve their skiing skills. Ski school lessons will be available for all levels of skiing ability. Fee for course.

PE 175. TENNIS — **No credit**
Designed to teach fundamental skills, terminology, mechanics of offensive and defensive movements, strategy, and rules of play.

PE 180. VOLLEYBALL — **No credit**
This course teaches the basic skills of volleyball. Serves, sets, bump passes, spikes, and rules of play are emphasized.

PE 198. TOPICS IN PHYSICAL EDUCATION — **No credit**
These courses are designed to meet specific needs of groups of students. The courses will be offered on a trial basis in order to determine demand and value of introducing them as part of the university curriculum.

PE 210. CONTEMPORARY HEALTH CONCEPTS — **Two credits**
A study of present-day health concepts. The course undertakes to help students enjoy maximum health and happiness through a better understanding of themselves, their relationships with other people, and their functions within today's environment. Topics covered: chemical use and abuse, consumer health, diet and weight control, diseases, emotional and mental disorders, exercise and physical fitness, human sexuality, etc.

PE 310. TREATING ATHLETIC INJURIES — **Three credits**
A course designed to provide experiences in application of various methods in treatment of athletic injuries. A study of preventive measures and medical management of athletic injuries. Experience in use of exercise techniques and physical modalities. Fee for course.

PE 315. EMERGENCY CARE TECHNIQUES — **Three credits**
A course designed to provide experiences (both practical and theoretical) in the application of advanced first aid and emergency care techniques. The successful completion of the course will enable the student to render such care.
Prerequisite: Student must possess a **current** Cardiopulmonary Resuscitation (CPR) Card.

PE 399. COOPERATIVE EDUCATION — **One to six credits**
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)
Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

PE 298/398. TOPICS IN PHYSICAL EDUCATION — **Variable credit**
A study in topics of special interest not extensively treated in regularly offered courses. This course will be offered from time to time when interest and demand justify it.

PHYSICS

Associate Professor Maxwell, Chairperson; Professors Hostler, Orehotsky, Placek; Associate Professor Kucirka; Assistant Professor Bibby. Emeriti: Professors Bellas, Donahoe; Associate Professor Bailey.

Total minimum number of credits required for a major in Physics leading to the B.A. degree — 127.
Total minimum number of credits required for a major in Physics leading to the B.S. degree — 129.
Total minimum number of credits required for a major in Medical & Health Physics leading to the B.S. degree — 131.
Total minimum number of credits required for a Physics minor — 18.
Total minimum number of credits required for a Physical Science minor — 21.

The Department of Physics takes seriously the responsibility of teaching on the undergraduate level. In order to prepare students to move on to graduate level studies or to enter the professional job market, the department offers three distinct curriculum tracks. These include the Bachelor of Science Degree in Physics, the Bachelor of Science Degree in Medical and Health Physics, and the Bachelor of Arts Degree in Physics.

The Bachelor of Science Degree in Physics is a modern program which prepares the student for graduate study in any of the scientific disciplines. The Bachelor of Science Degree in Medical and Health Physics is designed to prepare students for those areas of the medical and health sciences which employ the concepts of the physical sciences.

The Bachelor of Arts Degree in Physics is primarily designed for those students interested in teaching physics on the high school level. However, because of the greater flexibility in the Bachelor of Arts Program it is an excellent opportunity for electing additional courses from other fields such as chemistry, biology, engineering, and earth and environmental science. Consequently, this provides excellent background for advanced study in medicine, dentistry, and other related fields.

Students majoring in Physics may receive a Pennsylvania Teaching Certificate for teaching elementary school or Physics in grades 7-12. Please see the requirements listed in the Education section of this Bulletin.

Minor in Physics

To obtain a minor in physics a student must complete, with at least a grade of 2.0 or higher:

A. 18 credit hours of physics courses, 200-level or above, with
B. PHY 203 (Modern Physics) and
C. One of the following courses

1. Physics 310, Mechanics
2. Physics 340, Thermodynamics
3. Physics 331, Electricity and Magnetism I
4. Physics 336, Optics

Students may petition the department to substitute equivalent courses.

Minor in Physical Science

To obtain a minor in physical science a student must complete, with at least a grade of 2.0 or higher:

A. 21 credit hours of physics courses, including
B. Two of the following courses

1. GES 211, Physical Geology
2. GES 251/Phy 225, Synoptic Meteorology
3. GES 280/Phy 228, Principles of Astronomy

Students may petition the department to substitute equivalent courses.

Recommended Course Sequence for a B.A. Degree in Physics

First Semester		Second Semester	
Eng 101 Composition I	3	Eng 102 Composition II	3
Mth 111 Calculus I	4	Mth 112 Calculus II	4
or 105 Intro. to Calculus I		or 106 Intro. to Calculus II	
SSE 107 Technological Survival	3	Computer Science Elective	3
Distribution Requirement	3	Distribution Requirement	3
Free Elective*	3	Free Elective*	3
PE 100 Activity	0	PE 100 Activity	0
	16		16
Third Semester		**Fourth Semester**	
Chm 115 Elements & Compounds	4	Chm 116 Chemical Reaction	4
Mth 211 Differential Equations	4	Mth 212 Multivariable Calculus	4
or Science Elective**		or Science Elective**	
Phy 201 General Physics I	4	Phy 202 General Physics II	4
or 171 Introductory Physics I		or 172 Introductory Physics II	
Distribution Requirement	3	Distribution Requirement	3
	15		15

Distribution Requirement — 15 credits from Heritage and Value, 9 credits from Society and Human Behavior, and 3 credits from Artistic Expression. It is strongly recommended that Soc 391 & 392 be taken along with Phy 391 & 392.

*Free Electives — A minimum of 12 credits must be chosen from physics courses numbered 200 or above.

**Science Electives — May be chosen from any mathematics, science, or engineering courses numbered 200 or above.

Students aspiring to enter medical school should satisfy the Wilkes Premedical Core; see Health Sciences listing for a discussion of that Core.

Fifth Semester

Phy 203 General Physics III	3
or Science Elective**	
Phy 283 Elect. Instruments	3
Phy 397 Seminar	0
Distribution Requirements	6
Free Electives*	4-6
	16-18

Sixth Semester

Phy 397 Seminar	0
Statistics Elective	3
Distribution Requirements	6
Free Electives*	6-8
	15-17

Seventh Semester

Phy 391 Senior Projects I	1
Phy 397 Seminar	0
Free Electives*	15
	16

Eighth Semester

Phy 392 Senior Projects II	2
Phy 397 Seminar	1
Distribution Requirement	3
Free Electives*	12
	18

Distribution Requirement — 15 credits from Heritage and Value, 9 credits from Society and Human Behavior, and 3 credits from Artistic Expression. It is strongly recommended that Soc 391 & 392 be taken along with Phy 391 & 392.

*Free Electives — A minimum of 12 credits must be chosen from physics courses numbered 200 or above.

**Science Electives — May be chosen from any mathematics, science, or engineering courses numbered 200 or above.

Students aspiring to enter medical school should satisfy the Wilkes Premedical Core; see Health Sciences listing for a discussion of that Core.

Recommended Course Sequence for a B.S. Degree in Physics

First Semester

Eng 101 Composition I	3
Mth 111 Calculus I	4
SSE 107 Technological Survival	3
Phy 201 General Physics I	4
Distribution Requirement	3
PE 100 Activity	0
	17

Second Semester

Eng 102 Composition II	3
Mth 112 Calculus II	4
Phy 202 General Physics II	4
Computer Science Elective	3
Distribution Requirement	3
PE 100 Activity	0
	17

Third Semester

Chm 115 Elements & Compounds	4
Mth 211 Differential Equations	4
Phy 283 Elect. Instrumentation	3
Distribution Requirement	3
Free Elective	3
	17

Fourth Semester

Chm 116 Chemical Reaction	4
Mth 212 Multivariable Calculus	4
Phy 330 Optics	3
Phy 340 Thermodynamics	3
or 310 Analytical Mechanics I	
Distribution Requirement	3
	17

Fifth Semester

Phy 203 General Physics III	3
Phy 301 Math. in Phys. & Sciences	3
Phy 311 Analytical Mechanics II	3
or Distribution Requirement	
Phy 331 E & M I	3
Phy 381 E & M Lab I	1
Phy 397 Seminar	0
Distribution Requirement	3
	16

Sixth Semester

Phy 302 Math. in Phys. & Sciences	3
Phy 310 Analytical Mechanics I	3
or 340 Thermodynamics	
Phy 332 E & M II	3
Phy 354 Nuclear Physics	3
or 352 Atomic Physics	
Phy 382 E & M Lab II	1
Phy 397 Seminar	0
Distribution Requirement	3
	16

Seventh Semester

Phy 311 Analytical Mechanics II	3
or Distribution Requirement	
Phy 351 Quantum Mechanics	3
Phy 383 Advanced Physics Lab I	2
Phy 391 Senior Projects I	1
Phy 397 Seminar	0
Distribution Requirement	3
Free Elective	3
Science Elective*	0-3
	15-18

Eighth Semester

Phy 352 Atomic Physics	3
or 354 Nuclear Physics	
Phy 384 Advanced Physics Lab II	2
Phy 392 Senior Projects II	2
Phy 397 Seminar	1
Distribution Requirement	3
Science Elective*	3
	14

Distribution Requirement — 15 credits from Heritage and Value, 9 credits from Society and Human Behavior, and 3 credits from Artistic Expression. It is recommended that Soc 391 & 392 be taken along with Phy 391 & 392.

*Science Electives — May be chosen from any mathematics, science, or engineering courses numbered 200 or above. Students contemplating graduate studies should choose 6 of the credits in advanced mathematics.

Recommended Course Sequence for a B.S. Degree in Medical and Health Physics

First Semester

Eng 101 Composition I	3
Mth 111 Calculus I	4
SSE 107 Technological Survival	3
Phy 201 General Physics I	4
Distribution Requirement	3
PE 100 Activity	0
	17

Second Semester

Eng 102 Composition II	3
Mth 112 Calculus II	4
Phy 202 General Physics II	4
Distribution Requirements	6
PE 100 Activity	0
	17

Third Semester

Chm 115 Elements & Compounds	4
Mth 211 Differential Equations	4
Phy 203 General Physics III	3
Phy 283 Elect. Instrumentation	3
Distribution Requirement	3
	17

Fourth Semester

Chm 116 Chemical Reaction	4
EE 250 Biomedical Engineering	3
Phy 330 Optics	3
Distribution Requirements	6
	16

Fifth Semester		Sixth Semester	
Bio 115 Human Anat. & Phys. I or	4	Bio 116 Human Anat. & Phys. II or	4
Bio 121 Principles of Modern Biology I		Bio 122 Principles of Modern Biology II	
Chm 231 Organic Chemistry I	4	Chm 232 Organic Chemistry II	4
Science Elective*	4	Phy 397 Seminar	0
Phy 397 Seminar	0	Distribution Requirements	6
Medical Informatics or	3	Free Elective	3
Computer Science Elective			
	15		17

Seventh Semester		Eighth Semester	
Science Elective*	3	Phy 372 Med. & Health Phys. II	3
Phy 371 Med. & Health Phys. I	3	Phy 384 Advanced Physics Lab II	2
Phy 383 Advanced Physics Lab I	2	Phy 390 Practicum	3
Phy 390 Practicum	3	Phy 392 Senior Projects II	2
Phy 391 Senior Projects I	1	Phy 397 Seminar	1
Phy 397 Seminar	0	Distribution Requirement	3
Free Elective	3	Free Elective	3
	15		17

*Science Electives — May be chosen from any science or engineering courses numbered 200 or above. Students contemplating graduate studies should choose 6 of the credits in advanced mathematics.

Distribution Requirement — 15 credits from Heritage and Value, 9 credits from Society and Human Behavior, and 3 credits from Artistic Expression. It is recommended that Soc 391 & 392 be taken along with Phy 391 & 392.

Students aspiring to enter medical school should satisfy the Wilkes Premedical Core; see Health Sciences listing for discussion of that Core. Specifically, students need Bio 324 and Chm 361 or Chm 362.

PHY 101. GALAXIES TO ATOMS — **Three credits**

Traces the historical and philosophical development of the fundamental concepts of physics and the physical sciences. It begins with the ancient Greek view of the cosmos and how these ideas evolved into the mechanical view of the universe made famous by scientists like Galileo and Newton. The course also considers the concepts of modern atomic and nuclear physics and relativity and how these ideas have evolved into our present view of the physical world. Class meets three hours per week: two hours of lecture and one hour of laboratory. Fee: $10.

Prerequisite: No previous background in science or college-level mathematics is required.

PHY 102. THE FIFTH DIMENSION OF PHYSICS: SOCIETY — **Three credits**

Considers the great discoveries of physics and its applications to technology from Newton to Einstein and how these discoveries interface with broader social issues. Science and technology have been looked upon as the cause of many of our present problems such as air pollution and nuclear waste; simultaneously, society looks to science and technology for the solution to these problems. The course will consider these interactions as they relate to present problems of society. Class meets three hours a week: two hours of lecture and one hour of laboratory/discussion. Fee: $10.

Prerequisite: No previous background in science or college-level mathematics is required.

PHY 171-172. INTRODUCTORY PHYSICS I-II — **Four credits each**

An introductory course designed to promote an understanding of the more important fundamental laws & methods of the major areas of physics: mechanics, properties of matter, heat, thermodynamics, sound, light and optics, electricity and magnetism, etc. Laboratory work to emphasize basic principles and to acquaint the student with measuring instruments and their use, as well as the interpretation of experimental data. Demonstration-lecture two hours a week, recitation one hour a week, and one laboratory three hours a week. Fee: $45 per semester.

PHY 201. GENERAL PHYSICS I — **Four credits**

A thorough grounding in the concepts, principles, and laws of mechanics, thermodynamics, and wave motion. Instruction by demonstration-lecture, recitation, problem solving, and experimental work. Demonstration-lecture two hours a week, recitation one hour a week, and laboratory three hours a week. Fee: $45.

Corequisite: Mth 111.

PHY 202. GENERAL PHYSICS II — **Four credits**

Electricity and magnetism, optics and light. Demonstration-lecture two hours a week, recitation one hour a week, and laboratory three hours a week. Fee: $45.

Prerequisite: Phy 171 or 201.

Corequisite: Mth 112.

PHY 203. GENERAL PHYSICS III — **Three credits**

Modern physics including the experimental basis, concepts, and principles of atomic and nuclear physics. Demonstration-lecture three hours a week.

Prerequisite: Phy 202.

PHY 211. STATICS & DYNAMICS — **Three credits**

This course develops the principles of Newtonian mechanics with applications to the equilibrium of rigid structures as well as to the stable motions of mechanisms. Topics include velocities and accelerations in orthogonal coordinate systems; internal and external forces; inertia forces and the effective potential energy; centroids and moments of inertia; kinetics and kinematics of particles and rigid bodies. (same as ME 231)

Prerequisites: Phy 171 or 201, Mth 112.

PHY 213. FLUID MECHANICS — **Three credits**

Thermodynamics and dynamic principles applied to fluid behavior, ideal, viscous, and compressible fluids under internal and external flow conditions. (same as ME 233)

Prerequisite: Phy 211/ME 231.

PHY 225. SYNOPTIC METEOROLOGY — **Four credits**

Topics include surface and upper-air weather systems, weather phenomena, climate, and local weather influences. Synoptic map analysis and interpretation are emphasized. Three hours lecture and three hours laboratory. Fee: $45. (same as GES 251)

PHY 228. PRINCIPLES OF ASTRONOMY — **Four credits**

Topics include orbital mechanics, results of planetary probes, spectra and stellar evolution, and cosmology. Three hours lecture and three hours laboratory. Fee: $45. (same as GES 280)

PHY 260. INTRODUCTION TO MATERIALS SCIENCE AND ENGINEERING — **Three credits**

Application of materials properties to engineering design. Introduction to atomic arrangements, crystal structures, imperfection, phase diagrams, and structure-property relations. Fundamentals of iron, steel, and non-ferrous materials. The behavior of materials in environmental conditions. Three hours lecture a week. (same as MAE 200)

Prerequisites: Phy 201, 202.

PHY 283. ELECTRONIC INSTRUMENTATION — **Three credits**

An introduction to the nature and use of standard and specialized electronic instruments. The study of analog and digital circuits with emphasis on the useful functions which can be performed. A two-hour class and one three-hour laboratory a week. Fee: $40.

Prerequisite: Phy 172 or 202 or junior standing in the sciences.

PHY 301-302. MATHEMATICAL METHODS IN PHYSICS AND THE SCIENCES **Three credits each**

Study of different areas of mathematics and their applications in physics, engineering, and the sciences. Topics include: ordinary and partial differential equations, Fourier methods, complex variables, matrix methods, Green's functions, tensor analysis, group theoretical methods, and others. Three hours lecture-discussion a week. (Alternates every other year with Mth 361-362)

Prerequisites: Mth 211, 212.

PHY 310. ANALYTICAL MECHANICS I **Three credits**

An intermediate level course designed to provide a foundation in the principles of mechanics and in advanced techniques for the solution of mechanics problems. Topics include: Lagrangian and Hamiltonian approach; Kepler problem, particle motion in an electromagnetic field. Lecture-recitation three hours per week.

Prerequisites: Mth 211, 212, Phy 211.

PHY 311. ANALYTICAL MECHANICS II **Three credits**

A continuation of Physics 310. Topics include: Small oscillation theory and eigenvalue problems; rotations, tensor analysis, and rigid body dynamics. Elastic waves. Relativistic mechanics. Lecture-recitation three hours per week.

Prerequisite: Phy 310.

PHY 330. OPTICS AND LIGHT **Three credits**

The principles of geometrical and physical optics are considered in considerably greater detail than in the introductory course. Image formation, refraction, diffraction, origin of spectra, polarized light, optical activity, etc. Three hours of class per week.

Prerequisite: Phy 172 or 202.

PHY 331. ELECTRICITY & MAGNETISM I **Three credits**

Vector analysis. The concept of fields. Dielectric and magnetic media; fields in conductors; electric magnetic circuit elements. Maxwell's equations and boundary condition problems in one, two, and three dimensional space. Plane electromagnetic waves and power flow. Three hours lecture a week.

Prerequisites: Mth 211, Phy 202.

PHY 332. ELECTRICITY & MAGNETISM II **Three credits**

Development of Maxwell's equations and boundary-value problems. Plane wave propagation and reflection from boundaries; the Poynting Theorem; Transmission lines and strip lines; impedance transformation and Smith Charts; guided TEM, TE, and TM waves; radiation from dipole antenna. Three hours lecture a week.

Prerequisite: Phy 331/EE 331.

PHY 340. THERMODYNAMICS **Three credits**

The fundamental concepts and laws of thermodynamics. Carnot cycle, entropy and applications. Kinetic theory, statistical mechanics, and applications to fundamental systems. Lecture-discussion three hours a week.

Prerequisites: Phy 172 or 202, Mth 211 or 212.

PHY 351. QUANTUM MECHANICS **Three credits**

An introduction to Quantum mechanics. Schrodinger's equation and its application to the potential-well, the harmonic oscillator, and the hydrogen atom. Angular momentum perturbation theory. Identical particles; Pauli's exclusion principle. The Dirac relativistic wave equation and the origin of electron spin. Lecture-discussion three hours a week.

Prerequisites: Phy 301 or 310, Mth 361.

PHY 352. ATOMIC PHYSICS **Three credits**

Planck's theory of cavity radiation, photons, and the particle aspect of radiation, the wavelike properties of particles, Schroedinger's theory of quantum mechanics, one-electron atoms, special functions, use of recursion relations to evaluate selection rules, X-ray and optical excitations of multi-electron atoms, application of group theory to the normal modes of molecules, quantum statistics with simple applications to solids. Three hours lecture-discussion a week.

Prerequisite: Phy 203.

PHY 354. NUCLEAR PHYSICS **Three credits**

Some properties of nuclei: size, density, shape; the nuclear force; models of nuclear structure; unstable nuclei; radioactive decay; alpha decay, Gamow's theory; beta decay; Fermi's theory; gamma decay and the Moessbauer effect; nuclear reactions, the excited states of nuclei; fission and reactors; fusion and reactors; fusion, the origin of the chemical elements; elementary particles; unification. Lecture-discussion three hours a week.

Prerequisite: Phy 203.

PHY 360. INTRODUCTION TO SOLID STATE PHYSICS **Three credits**

Introduction to bonding and crystal structure, symmetry considerations, recriprocal lattice considerations, lattice dynamics, electronic structure of simple metals, insulators, and semiconductors, dielectric, ferroelectric, and magnetic properties of materials. Three-hour lecture.

Prerequisite: Phy 203.

PHY 361. X-RAY DIFFRACTION **Four credits**

Study of structure and composition of solids using X-rays. Effects of annealing, substructures, cold work, preferred orientation, and ordering. Principles of design and applications of X-ray diffraction techniques. Three hours lecture and one three-hour laboratory a week. Fee: $50. (same as MAE 311)

Prerequisite: Phy 203.

PHY 371-372. MEDICAL & HEALTH PHYSICS I & II **Three credits each**

A study of the applications of basic physical principles to various problems in the medical and health sciences. These include the effect of ionizing and non-ionizing radiation on living matter and the various techniques of scanning and image formation. Also included will be the topics of dosimetry, lasers in medicine, computer amsted diagnoses and other areas of interest to medical and health physicists. Fee: $45 per semester.

Prerequisite: Junior standing in the program or approval of instructor.

PHY 381. ELECTRICITY & MAGNETISM LAB I **One credit**

Laboratory experiments are performed which illustrate fundamental electromagnetic field concepts in distributed systems and in lumped element circuits. Experiments are partially planned by the students and reported both formally and informally. One three-hour laboratory a week. Fee: $45.

Corequisite: Phy 331/EE 331.

PHY 382. ELECTRICITY & MAGNETISM LAB II **One credit**

A continuation of Phy 333 with emphasis on transmission line concepts and the interaction of electromagnetic fields and matter. One three-hour laboratory a week. Fee: $45.

Prerequisite: Phy 333/EE 333.

PHY 383. ADVANCED LABORATORY I **Two credits**

A laboratory course of experiments and projects in fundamental and applied physics, concentrating on lasers and modern optics. One four and one-half hour meeting per week. Fee: $50.

Prerequisites: Phy 283, junior or senior standing in the sciences.

PHY 384. ADVANCED LABORATORY II **Two credits**
A laboratory course of experiments and projects in fundamental and applied physics, concentrating on atomic physics, nuclear physics, and physical properties of materials, including the interaction of radiation with materials. One four and one-half hour meeting per week. Fee: $50.

Prerequisites: Phy 221, junior or senior standing in the sciences.

PHY 390. PRACTICUM **Three credits**
Training assignment under the direct supervision of a working professional in a specialty appropriate to the student's curriculum. Participating institutions such as hospitals, laboratories, and industrial or academic facilities will cooperate in this training. Can be repeated for credit.

Prerequisite: Department approval.

PHY 391. SENIOR PROJECTS I **One credit**
Design and development of selected projects in physics and other related fields under the direction of a staff member. Technical as well as economic factors will be considered in the design. A professional paper and detailed progress report are required.

Prerequisite: Senior standing in physics.

PHY 392. SENIOR PROJECTS II **Two credits**
Design and development of selected projects in physics and other related fields under the direction of a staff member. Technical as well as economic factors will be considered in the design. A professional paper to be presented and discussed in an open forum is required.

Prerequisite: Senior standing in physics.

PHY 395-396. INDEPENDENT RESEARCH **One to three credits**
Independent study and research for advanced students in the field of physics under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.

Prerequisites: Senior standing and approval of department chairperson.

PHY 397. SEMINAR **Zero or one credit**
Presentations and discussions of selected topics in physics. All junior and senior physics majors are expected to register for Seminar every semester. One credit given in senior year.

Prerequisite: Approval of department chairperson is required.

PHY 399. COOPERATIVE EDUCATION **One to six credits**
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

PHY 198/298/398. TOPICS IN PHYSICS **Variable credit**
Selected topics in the field of physics. These may include one or more of the following: astronomy; geophysics; biophysics; nuclear power & waste; relativity; quantum mechanics; semiconductors; cryogenics; health physics. May be repeated for credit.

Prerequisite: Varies with topic studied.

POLITICAL SCIENCE AND PUBLIC ADMINISTRATION

Professor Baldino, Chairperson; Professor Emerita Driscoll; Assistant Professor Emeritus Tuhy; Professor Basu; Associate Professors Auerbach, Brand; Adjunct Professors Gallet, Lewis, Poplawski.

Total minimum number of credits for a major in Political Science leading to a B.A. degree — 120.
Total minimum number of credits for a minor — 21.
Total minimum number of credits for a concentration in Public Administration — 46.

A major in Political Science requires 121 hours. These include 46 hours in the University's General Education requirements and 34 hours in political science. All majors must take the following courses that comprise the Basic Core in political science: PS 111, 141, 161, and 261 (or Soc 370) for a total of 12 credit hours. Students will then choose an additional 18 credits in political science of which at least 6 credits come from courses at the 300-level or higher. Finally, all majors must take the Senior Core requirement: PS 381, 382 for 4 credit hours.

Students majoring in Political Science may receive a Pennsylvania Teaching Certificate for teaching elementary school or Social Studies in grades 7-12. Please see the requirements listed in the Education section of this Bulletin.

A minor in Political Science requires that the student take the Basic Core in political science described above (12 credits), and an additional 9 credits at the 200-level or higher for a total of 21 credits.

Students may choose to concentrate in Public Administration by taking 43 credits. All public administration students must take: PS 111, 121, 141, 161 plus the Senior Core requirement of PS 381 and 382. A practicum or co-op experience is also required for a minimum of 3 credits. Nine additional credits in political science/public administration are required of which at least 6 credits must be at the 300-level or higher. This is a total of 34 credit hours in political science/public administration. An additional 15 credits in electives chosen from cognate fields are also required.

As a traditional liberal arts discipline, students who choose to major in political science are broadly trained and so have a wide variety of career options available. Among the most common fields of employment are government, law, education, social services, media, business, and foreign/international service.

See the Pre-Law section for information on law school advising and admissions.

Recommended Course Sequence for a Major in Political Science

First Semester		Second Semester	
Eng 101 Composition I	3	Eng 102 Composition II	3
PS 111 Intro. to American Politics or	3	PS 111 Intro. to American Politics or	3
PS 141 Intro. to International Politics		PS 141 Intro. to International Politics	
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15		15

Third Semester		Fourth Semester	
PS 161 Intro. to Political Thinking	3	Major Elective	3
Distribution Requirements	12	PS 261 Concepts and Methods or	3
	15	Soc 370 Methods	
		Distribution Requirements	9
			15

Fifth Semester		Sixth Semester	
Major Electives	6	Major Electives	9
(one course must be at 300 level)		(one course must be at 300 level)	
Free Electives	9	Free Electives	6
	15		15

Seventh Semester		Eighth Semester	
PS 381 Senior Colloquium I	1	PS 382 Senior Colloquium II	3
Free Electives	15	Free Electives	12
	16		15

Recommended Course Sequence for Concentration in Public Administration

First Semester		Second Semester	
Eng 101 Composition I	3	Eng 102 Composition II	3
PS 111 Intro. to American Politics or	3	PS 111 Intro. to American Politics or	3
PS 141 Intro. to International Politics		PS 141 Intro. to International Politics	
PE 100 Activity	0	Distribution Requirements	9
Distribution Requirements	9	PE 100 Activity	0
	15		15

Third Semester		Fourth Semester	
PS 121 Intro. to Public Administration	3	PS 161 Intro. to Political Thinking	3
Ec 101 Principles of Economics I	3	Ec 102 Principles of Economics II	3
Distribution Requirements	9	Mth 150 Statistics	3
		Distribution Requirements	6
	15		15

Fifth Semester		Sixth Semester	
Public Administration Elective	3	Public Administration Electives	6
Acc 121 Intro. Financial Accounting	3	BA 212 Government and Business	3
Free Elective	3	Free Elective	3
Distribution Requirements	6	Ec 236 Public Finance	3
	15		15

Seventh Semester		Eighth Semester	
PS 381 Senior Colloquium I	1	PS 382 Senior Colloquium II	3
Free Electives	15	PS 394 Practicum or	3
	16	PS 399 Cooperative Education	
		Free Electives	9
			15

PS 111. INTRODUCTION TO AMERICAN POLITICS **Three credits**
A descriptive and analytical study of the theory and practice of American government, its constitutional basis, organization, powers, functions, and problems.
Offered every semester.

PS 121. INTRODUCTION TO PUBLIC ADMINISTRATION **Three credits**
An introduction to the principles and problems of public administration in an increasingly complex society. Attention to such topics as leadership, informal organizational processes (infrastructure), the relation of administration to its cultural context, and the question of administrative responsibilities. Survey of the technical problems of personnel, finance, and administrative law.
Prerequisite: PS 111 or consent of instructor.
Offered every fall.

PS 131. LAW AND SOCIETY **Three credits**
An introduction to the study of law and its role in social and political systems. Attention is given to theories of law, and the structure of the legal system. Students are given the opportunity to engage in hypothetical dispute resolutions using common law methods.
Offered every year.

PS 141. INTRODUCTION TO INTERNATIONAL POLITICS **Three credits**
An introduction to the field of international relations. Attention is given to basic theories of international relations as well as the issues and problems that confront contemporary world politics. Factors that determine a nation's foreign policy are also examined.
Offered every spring.

PS 161. INTRODUCTION TO POLITICAL THINKING **Three credits**
An introduction to the study of politics through an examination of the crucial issues with which political scientists grapple: justice, equality, freedom, power, and the good life, to name a few.
Offered every spring.

PS 211. STATE AND LOCAL GOVERNMENT **Three credits**
An examination of the structure and operation of state and local (municipal) governments in the United States. Attention is also given to the politics and policy problems confronting contemporary state and local governments.
Prerequisite: PS 111 or consent of instructor.
Offered irregularly.

PS 212. URBAN GOVERNMENT AND POLITICS **Three credits**
An examination of the structure and operation of urban governments. Metropolitan politics is also considered. Special attention is given to the politics and policy problems confronting American cities set to enter the 21st century.
Prerequisite: PS 111 or consent of instructor.
Offered irregularly.

PS 213. POLITICAL PARTIES AND POLITICAL PARTICIPATION **Three credits**
An introduction to the role and function of political parties in democratic regimes, with particular attention given to the U.S. Extensive discussion of the political activites of the American electorate in forms other than parties, such as interest groups, as well as grass roots movements.
Prerequisite: PS 111 or consent of instructor.
Offered every fall.

PS 221. INTERGOVERNMENTAL RELATIONS **Three credits**
Analysis of the process by which multiple public jurisdictions interact in the United States federal system and the impact of this process on public policy.
Prerequisite: PS 111 or consent of instructor.
Offered irregularly.

PS 231. INTRODUCTION TO LEGAL AND JUDICIAL ADMINISTRATION **Three credits**
An introduction to the study of the structure, operation, administration and management of the legal system. Attention is given to both the private law office and the court system in America.
Prerequisite: PS 111 or consent of instructor.
Offered every fall.

PS 232. CRIMINAL LAW **Three credits**
An introduction to the study of criminal law. The principles of criminal law are presented using the case method. The structure and operation of the criminal justice system are also reviewed.
Prerequisite: PS 111 or 131 or consent of instructor.
Offered every year.

PS 251. EUROPEAN POLITICS **Three credits**
Comparison of the development, institutions, problems and prospects of democratic systems in Europe, both west and east. Attention is given to the European Community and its role in the transformation of Europe as well as to the development of the former communist states in eastern Europe.
Prerequisite: PS 141 or consent of instructor.
Offered in alternate years.

PS 253. POLITICS OF DEVELOPING NATIONS **Three credits**
The political process in the non-industrialized areas of the world, including Asia, Africa and Latin America. Examines the problems of economic and political change and the relations of these areas to the Western world and communist nations.
Prerequisite: PS 141 or consent of instructor.
Offered in alternate years.

PS 261. CONCEPTS AND METHODS IN POLITICAL SCIENCE **Three credits**
A survey of the major concepts, theories and methods of political science as a discipline. Preparation of a research design and a review of quantitative methods also included.
Prerequisite: Sophomore standing.
Offered in alternate years.

PS 262. AMERICAN POLITICAL THOUGHT **Three credits**
The study of the political ideas, ideals and ideologies which contributed to and developed from the American experience. An analysis of the ideas which underlie our political institutions and practices.
Prerequisite: PS 111 or consent of instructor.
Offered every year.

PS 311. THE AMERICAN PRESIDENCY **Three credits**
An exploration and analysis of the development and powers of the American President as political leader, chief executive, and world leader. Special attention is given to the selection process and the effect of the process on the Presidency.
Prerequisite: PS 111 or consent of instructor.
Offered every fall.

PS 312. LEGISLATIVE BEHAVIOR **Three credits**
An analysis of the theory and practice of representative institutions in political systems with emphasis given to the American Congress. Legislative elections, floor procedures, committee functions, and ethics are all considered as well as their collective impact upon the formation of public policy.
Prerequisite: PS 111 or consent of instructor.
Offered every spring.

PS 321. PUBLIC BUDGETING **Three credits**
An examination of the political and administrative aspects of the government budgeting process, including the possibilities and consequences of recent budgetary reforms.
Prerequisite: PS 111 or consent of instructor.
Offered irregularly.

PS 322. ADMINISTRATIVE LAW AND POLICY **Three credits**
An analysis of the manner in which public policy is made and affected by administrative agencies, of the ways in which the public administrator operates and the linkages among administrative organizations and other policy-making bodies and law.
Prerequisite: PS 111 or consent of instructor.
Offered irregularly.

PS 331. CONSTITUTIONAL LAW I **Three credits**
The study of the growth and change of the American Constitution through analysis of the leading cases decided by the U.S. Supreme Court. Analysis of the powers of the three branches of government and of the relations between the states and the federal government.
Prerequisite: PS 111 or PS 131, or consent of instructor.
Offered every fall.

PS 332. CONSTITUTIONAL LAW II **Three credits**

Continuation of the study of the meaning of the Constitution as interpreted by the Supreme Court. Analysis of the landmark decisions regarding free speech and press, separation of church and state, rights of persons accused of crimes, equal protection of the laws, voting rights.

Prerequisite: PS 111 or PS 131, or consent of instructor.

Offered every fall.

PS 335. LEGAL RESEARCH FOR THE JUDICIAL ADMINISTRATOR **Three credits**

The methods of legal research are presented. Students are taught to use legal reference materials and computerized information retrieval systems. The proper form and style of legal writing is also studied.

Prerequisite: PS 231 or consent of instructor.

Offered every spring (beginning 1994).

PS 342. INTERNATIONAL LAW AND ORGANIZATION **Three credits**

The study of the nature, application, and sources of international law and how it relates to the evolution of global and regional organizations and alliances, including international non-governmental organizations and other non-state actors.

Prerequisite: PS 141 or consent of instructor.

Offered in alternate years.

HST 328. U.S. FOREIGN POLICY **Three credits**

See description under History Department listings.

PS 351. POLITICS OF RUSSIA AND COMMONWEALTH OF INDEPENDENT STATES **Three credits**

An analysis of the social and political conditions out of which the communist system of the Soviet Union developed and changed into its current confederated form. Examines the legacy of Marxism and Leninism in the context of current developments and to the problems of coordinating the activities of an ethnically diverse group of sovereign nations.

Prerequisite: PS 141 or consent of instructor.

Offered in alternate years.

PS 361. HISTORY OF POLITICAL THOUGHT I **Three credits**

An examination of the roots of Western political thinking by studying major political thinkers from Plato to Machiavelli. The course seeks to provide the student with an appreciation of the relevance of political philosophy to the discipline of political science. Students are exposed to classical political theory by reading primary rather than secondary sources.

Prerequisite: PS 161 or consent of instructor.

Offered every fall.

PS 362. HISTORY OF POLITICAL THOUGHT II **Three credits**

An examination of modern political thought from Thomas Hobbes through Karl Marx. The course seeks to provide the student with an appreciation for the relevance of political philosophy to the discipline of political science. Students are exposed to modern political theory by reading primary rather than secondary sources.

Prerequisite: PS 161 or consent of instructor.

Offered every spring.

PS 381. COLLOQUIUM I **One credit**

A seminar devoted to a discussion of the seminal works and major themes in the discipline of political science. Students will also explore individual research topics and prepare a research design.

Prerequisite: Senior standing.

Offered every fall.

PS 382. COLLOQUIUM II **Three credits**

A continuation of the discussion of seminal works and major themes begun in PS 482. Students will complete their research work and present their findings to the seminar.

Prerequisite: Senior standing.

Offered every spring.

PS 394. PRACTICUM **Three to six credits**

Internship or similar experience in administrative office, community agency, election campaign, or work related to administration or politics.

Prerequisite: At least 4 courses in PS or in Urban Studies, or in a field in which internship will be served, such as Earth and Environmental Sciences. Student must consult with department chairperson before registering.

Offered every semester.

PS 395-396. INDEPENDENT RESEARCH **One to three credits**

Independent study and research for advanced students in the major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.

Prerequisite: Approval of department chairperson.

Offered every semester.

PS 399. COOPERATIVE EDUCATION **One to six credits**

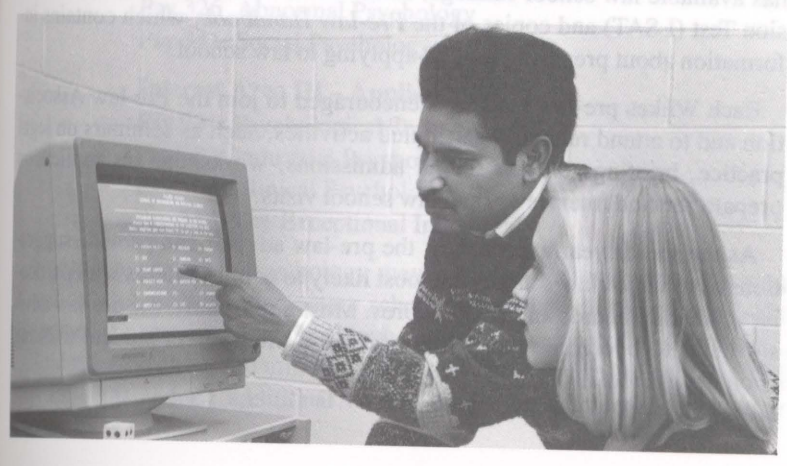
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

PS 198/298/398. TOPICS IN POLITICAL SCIENCE/ TOPICS IN POLICY ANALYSIS **Variable credit**

A study of topics of special interest not extensively treated in regularly offered courses. Examples of possible topics would be: leadership in Congress; minorities in the political process; women and power; urban design; the First Amendment in law and practice; equality at law in an unequal society; Marxism, etc. May be repeated when topics differ. A topics course in a specific field of public policy, such as Energy, Environmental Science, Mental Health and Retardation, etc., may be offered also.

Prerequisite: Permission of department chairperson, criterion depending on topic.



PRE-LAW STUDIES

Associate Professor Auerbach, Coordinating Advisor.

Wilkes University has developed a carefully designed pre-law advisory program which has proved able to provide exceptionally effective support for students seeking admission to graduate schools of law. The Pre-law Program at Wilkes is based on the principle that admission to, and success in, law school depends upon completion of a rigorous curriculum at the undergraduate level as well as an up-to-date understanding of the law school admission process. One of the greatest strengths of Wilkes University is its ability to provide students from different educational backgrounds with a sound education that prepares them for the challenges of leading professional schools.

Law schools do not prescribe a specific undergraduate major but rather suggest a broadly-based educational program which enhances the student's ability to reason, read analytically, and write effectively. Students interested in law school may major in any field, but the most frequently chosen areas are: political science, English, history and business administration. Majors such as philosophy, sociology, nursing, biology, engineering, computer science, psychology, or earth and environmental science also provide appropriate preparation for legal studies. Indeed, a major in a technical field may be especially useful in particular aspects of legal practice.

Advising

Wilkes students are assigned to faculty advisors in the areas of their majors. These advisors guide them regarding degree requirements in particular fields. Pre-law students also consult with a designated pre-law advisor, who acquaints them with aspects of legal study and practice. The pre-law advisor has available law school catalogs, information on the Law School Admission Test (LSAT) and copies of the *Pre-law Handbook,* which contains information about preparing for and applying to law school.

Each Wilkes pre-law student is encouraged to join the Pre-law Association and to attend regularly scheduled activities, such as seminars on legal practice, briefings on law school admissions, workshops on application preparation and interviews, and law school visits.

As the senior year approaches, the pre-law advisor can provide suggestions as to which law schools are most likely to admit students with particular academic records and LSAT scores. Most importantly, the pre-law advisor helps to overcome the myths which too often affect student thinking about law schools.

PSYCHOLOGY

Professor Charnetski, Chairperson; Professor Emeritus Riley; Assistant Professor Emeritus Kanner; Professor Bellucci; Associate Professors Bohlander, Stetten; Assistant Professor Adair.

Total minimum number of credits for a major in Psychology leading to the B.A. degree — 120.

Total minimum number of credits for a minor — 18.

Psy 101 is the starting point for the psychology program and must be taken by all psychology majors. This course does not count toward the 27 credit hours of psychology required of majors. In addition to Psy 101, the psychology major must take Psy 200 (Research Design and Analysis). It is strongly recommended that Psy 310 (Experimental Psychology) be taken if the student is planning graduate study. The General Education Requirements must be satisfied by the Psychology major. It is strongly recommended that students who major in Psychology take a foreign language.

It is required that the student take at least one course from each of the Interest Areas below.

Interest Area I – Research
Psy 310 Experimental Psychology
Psy 313 Physiological Psychology
Psy 314 Sensory and Perceptual Processes

Interest Area II – Theoretical
Psy 221 Developmental Psychology
Psy 222 Human Behavior
Psy 223 Contemporary Psychological Theories
Psy 226 History of Psychology
Psy 321 Comparative Psychology
Psy 326 Abnormal Psychology
Psy 341 Social Psychology

Interest Area III – Applied
Psy 231 Psychological Tests
Psy 233 Industrial Psychology
Psy 332 Clinical Psychology
Psy 335 The Exceptional Individual

Students majoring in psychology may receive a Pennsylvania Teaching Certificate for teaching elementary school or social studies in grades 7-12. Please see the requirements listed in the education section of this **Bulletin**.

Students who choose to minor in psychology are required to take Psy 101 and Psy 200 and an additional twelve credits in advanced psychology courses.

Recommended Course Sequence for a Major in Psychology

First Semester		Second Semester	
Psy 101 General Psychology*	3	Major Elective	3
Eng 101 Composition I	3	Eng 102 Composition II	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15		15
Third Semester		**Fourth Semester**	
Major Elective or Psy 200 Research and Design*	3	Major Elective or Psy 200 Research and Design*	3
Distribution Requirements	12	Distribution Requirements	9
		Free Elective	3
	15		15
Fifth Semester		**Sixth Semester**	
Psy 211 Experimental Psychology †	3	Major Electives and/or Psy 200 Research and Design*	6
Major Elective or Psy 200 Research and Design*	3	Free Electives	9
Free Electives	9		
	15		15
Seventh Semester		**Eighth Semester**	
Psy 395 Independent Research †	3	Psy 396 Independent Research †	3
Cooperative Education †	6	Free Electives	12
Free Electives	6		
	15		15

*Required
†Recommended

PSY 101. GENERAL PSYCHOLOGY **Three credits each**
An introduction to the field of psychology with emphasis on objective and systematic methods of inquiry. Extensive treatment of major psychological topics such as sensation, perception, learning, motivation, intelligence, and personality development. Frustration, conflict, and mental health also receive attention.

PSY 200. RESEARCH DESIGN AND ANALYSIS **Three credits**
An introduction to the use of scientific methods as a means of studying behavior. This course is required of all majors.

PSY 220. ADVANCED GENERAL PSYCHOLOGY **Three credits**
A more detailed study of topics treated only superficially in the introductory course. There will be emphasis on contemporary readings.
Prerequisite: Psy 101.

PSY 221. DEVELOPMENTAL PSYCHOLOGY **Three credits**
The course provides a general view of human growth and development from conception through infancy, childhood, and adolescence. It focuses on innate characteristics and the manner in which they are modified by the environment during the developmental process. Psychosocial development as well as physical, language, and intellectual development are considered.
Prerequisite: Psy 101.

PSY 222. HUMAN BEHAVIOR **Three credits**
Human adjustment and maladjustment to life situations with emphasis on motivation, emotional control, personality formation, and the treatment of the lesser personality disorders.
Prerequisite: Psy 101.

PSY 223. CONTEMPORARY PSYCHOLOGICAL THEORIES **Three credits**
An examination of current theories in psychology, with emphasis upon the major systematic and "miniature" learning theories.
Prerequisite: Psy 101.

PSY 226. HISTORY OF PSYCHOLOGY **Three credits**
A study of the philosophic and scientific roots of contemporary psychology, with emphasis on the applicability of past questions and knowledge to current psychological thought.
Prerequisite: Psy 101.

PSY 231. PSYCHOLOGICAL TESTS **Three credits**
A survey of the functions measured by psychological tests with emphasis on intelligence and personality. A variety of the group and individual tests which measure these functions are studied. This course is a prerequisite for Psy 332.
Prerequisite: Psy 101.

PSY 233. INDUSTRIAL PSYCHOLOGY **Three credits**
A survey of the applied areas of personnel, organizational, human factors, and consumer psychology.
Prerequisite: Psy 101.

PSY 310. EXPERIMENTAL PSYCHOLOGY **Three credits each**
A lecture and laboratory course designed to familiarize the student with the methods and the results of modern psychological research. The course includes a study of several of the famous experiments in the field of psychology. Also included is practice with the older as well as the more recent methods of experimental research. Lecture and laboratory. Fee: $40.
Prerequisite: Psy 200.

PSY 313. PHYSIOLOGICAL PSYCHOLOGY **Four credits**
A study of the physiological mechanisms mediating behavior. Emphasis on the structure and function of the nervous system and the neurophysiological bases of sensory processes, emotion, abnormal behavior, sleep, learning and memory. Laboratory experience includes brain dissection, small animal experimentation, and demonstrations of neurosurgical technique. Fee: $20.
Prerequisites: Psy 101; junior or senior standing.

PSY 314. SENSORY AND PERCEPTUAL PROCESSES **Three credits**
Principles and phenomena of human sensory and perceptual processes are studied within the visual, auditory, olfactory, gustatory, proprioceptive and cutaneous systems. Students are familiarized with techniques used in the investigation of sensory and perceptual phenomena.
Prerequisite: Psy 101.

PSY 321. COMPARATIVE PSYCHOLOGY **Three credits**

A survey of underlying genetic and biological mechanisms influencing human and non-human behavior. Emphasis is on the role of evolution and natural selection in the development of behavioral adaptations, and to behavioral comparisons among species. Topics include the fields of ethology, sociobiology, and behavioral genetics.

Prerequisite: Psy 101.

PSY 326. ABNORMAL PSYCHOLOGY **Three credits**

A general survey of the principle forms of mental abnormalities, with emphasis on causes, symptoms, course, and treatment.

Prerequisite: Psy 232.

PSY 332. CLINICAL PSYCHOLOGY **Three credits**

A survey of the clinical method in psychology with consideration of diagnostic and treatment techniques and the role of the professional psychologist in various settings.

Prerequisites: Psy 231 and Psy 326.

PSY 335. THE EXCEPTIONAL INDIVIDUAL **Three credits**

A study of the psychological, physical, and social problems and needs of exceptional individuals. Major emphasis is placed on the diagnosis, psychological assessment, and clinical observation of three types of exceptionality: the mentally defective, gifted, and sensory-motor impaired.

Prerequisites: Psy 101 and Psy 221.

PSY 341. INTRODUCTION TO SOCIAL PSYCHOLOGY **Three credits**

A general survey of the field of social psychology. Social factors in human nature; psychology of individual differences; social interaction; collective behavior, psychology of personality; social pathology.

Prerequisites: Soc 101 or Ant 101 or Psy 101, or approval of instructor.

PSY 395-396. INDEPENDENT RESEARCH **One to three credits**

Independent study and research for advanced students in the field of the major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.

Prerequisite: Approval of department chairperson is required.

PSY 397. SEMINAR **(Maximum of three credits per student) One to three credits**

Presentations and discussions of selected topics.

Prerequisite: Approval of department chairperson is required.

PSY 399. COOPERATIVE EDUCATION **One to six credits**

Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

PSY 198/298/398. TOPICS IN PSYCHOLOGY **Variable credit**

A study in topics of special interest not extensively treated in regularly offered courses.

SOCIOLOGY

Associate Professor Garr, Chairperson; Associate Professors Merryman, Natzke; Assistant Professor Tuttle.

Total minimum number of credits required for a major in Sociology leading to the B.A. degree — 120.
Total minimum number of credits required for a minor — 18.

Obtaining a major in Sociology prepares students for a variety of careers. Students who graduate with a major in Sociology find jobs in social services, criminal justice, business, and education. Students who decide to pursue a graduate education can do so in a variety of fields including sociology, law, social work, business and psychology among others.

A unique feature of the program in Sociology is its flexibility. Students have the opportunity to pursue a full range of academic options beyond the major. For example, utilizing existing programs and courses, it is possible for students to achieve a dual major in Sociology and Psychology, Sociology and Criminal Justice, or to finish an MBA in five years.

Sociology Major

A major in sociology consists of 30 hours, including Soc 101, either Ant 101 or Ant 102, Soc 341, Soc 371 and Soc 381. All anthropology courses may be taken for credit toward the major or minor in sociology. Also Phl 230 and/or Phl 350 may be taken for credit toward the major. Sociological analysis 394 and/or Mth 150 Elementary Statistics is strongly recommended for students planning graduate studies in sociology. Courses required in the major such as Soc 101, Ant 101 and/or Ant 102 may also be used to fulfill distribution requirements. The department emphasizes internships in professional settings which integrate academic studies with work experiences such as Soc 393 Practicum and Soc 399 Cooperative Education. The credit hours earned in Soc 393 and Soc 399 may not be applied toward the 30 hours required for the major.

Sociology Minor

A minor in Sociology consists of 18 hours, including Soc 101. At least one of the following courses is required: Social Psychology 341; Sociological Methods 371; Sociological Theory 381.

The department offers Practicum (Soc 393), a supervised practical field experience designed for sociology minors, in a professional setting. The six hours earned in Practicum may not be applied toward the eighteen hours required for the minor.

Social Work/Human Services

Students interested in careers in drug and alcohol counseling, agency counseling, social work, or other human services occupations are urged to take at least three courses in social work (Soc 231, 232, and 233), and two courses in psychology, and complete 120 hours of supervised practical field experience in a professional setting (Soc 393 and/or Soc 399). The latter requirement may be completed under the auspices of the Cooperative Education Program (see page 52).

Certification in Education

The teacher education program at Wilkes requires students to major in a discipline other than education. Sociology is one of several options for individuals who seek teacher certification in elementary education or Social Studies certification to teach in grades 7-12. Please see the requirements listed in the Education section of this Bulletin.

Pre-Law

Students interested in law school may major in any field. Sociology provides appropriate preparation for legal studies. A description of Pre-Law studies is on page 302.

Criminal Justice

Students interested in the criminal justice field may pursue the equivalent of a second major or a minor through a reciprocal agreement with King's College. Students should talk to the Chairperson for details concerning the program.

Anthropology

Students can choose a concentration in Anthropology. The concentration consists of 12 hours, including Ant 101, Ant 102 and two upper-level courses in Anthropology.

Five-Year Sociology/MBA Program

Students with an interest in business, but who want a well-rounded background desired by business employers, should consider the 5-year Sociology/MBA Program. Students can complete the Sociology major in four years and with one additional year of schooling also complete a Masters in Business Administration at Wilkes.

Recommended Course Sequence for a Major in Sociology

First Semester		Second Semester	
Soc 101 Intro. to Sociology	3	Ant 101 Intro. to Anthropology	3
Eng 101 Composition I	3	Eng 102 Composition II	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15		15
Third Semester		**Fourth Semester**	
Distribution Requirements	6	Distribution Requirements	6
Major Elective	3	Major Elective	3
Free Electives	6	Free Electives	6
	15		15
Fifth Semester		**Sixth Semester**	
Soc 341 Social Psychology	3	Major Electives	6
Major Elective	3	Free Electives	9
Free Electives	9		15
	15		
Seventh Semester		**Eighth Semester**	
Soc 371 Methods*	3	Soc 381 Sociological Theory*	3
Free Electives	12	Free Electives	12
	15		15

*Students with educational aspirations beyond the bachelor's degree and/or full-time internship commitments during the eighth semester (e.g. Soc 399 Practicum 6cr, Cooperative Education 9cr) should plan to take Soc 370 and Soc 380 in their fifth and sixth semesters respectively.

Recommended Course Sequence for Students Majoring in Sociology who wish to pursue a Master of Business Administration Degree

First Semester		Second Semester	
Soc 101 Intro. to Sociology	3	Ant 101 or 102 Intro. to Anthropology	3
CS 115 Survey of Computers	3	Eng 102 Composition II	3
Eng 101 Composition I	3	Distribution Requirements	9
Distribution Requirements	6	PE 100 Activity	0
PE 100 Activity	0		15
	15		

Third Semester

Sociology Elective	3
Ec 101 Economics I	3
Acc 101 Financial Accounting	3
Distribution Requirements	6
	15

Fourth Semester

Sociology Elective	3
Ec 102 Economics II	3
Acc 102 Managerial Accounting	3
Distribution Requirements	6
	15

Fifth Semester

Soc 341 Social Psychology	3
Ec 230 Money and Banking	3
Free Electives	9
	15

Sixth Semester

Sociology Elective	3
BA 341 Managerial Finance	3
BA/Ec 319 Business/Ec Statistics	3
Free Electives	6
	15

Seventh Semester

Soc 371 Methods of Research	3
Sociology Elective	3
BA 233 Legal Environment of Business	3
Free Electives	6
	15

Eighth Semester

Soc 381 Sociological Theory	3
Soc 395 Independent Research	1
Sociology Elective	3
BA 321 Marketing	3
Free Electives	6
	16

SOC 101. INTRODUCTION TO SOCIOLOGY **Three credits**
A systematic view of sociology, providing essentials for an approach to questions about man in society; analysis of social processes, structures, and functions.

SOC 211. THE FAMILY **Three credits**
History and ethnological studies of family. Role of family in the development of the individual. Interrelation of church, state, and family. Social conditions and changes affecting the American family. Family stability and disorganization.
Prerequisite: Soc 101 or Ant 101 or 102 or approval of instructor.

SOC 212. HUMAN SEXUALITY I **Three credits**
A balanced and thoughtful introduction to what is currently known about human sexuality. Research in sexuality comes from a variety of disciplines including Psychology, Sociology, Biology, Medicine, Physical Education and Human Education. Without assuming that the student has an extensive background in any of these fields, this course draws liberally on all of them and works hard to show how the biology, psychology and sociology of sex are interrelated.
Prerequisite: Soc 101 or approval of instructor.
Offered each fall semester.

SOC 213. HUMAN SEXUALITY II **Three credits**
An advanced course in Human Sexuality with an emphasis on current research findings and issues.
Prerequisite: Soc 212.
Offered each spring semester.

SOC 214. SEX ROLES **Three credits**
This course deals with the origins of sex roles, the historical changes in sex roles, the consequences of sex roles to the individual and to society, and the outlook for sex roles in the future.
Prerequisites: Soc 101 or Ant 101 or 102 or approval of instructor.

SOC 215. FAMILY VIOLENCE **Three credits**
It is customary to think of violence between family members as infrequent and, when it does occur, as being the result of some mental defect or aberration. Research evidence shows that neither of these views is correct. This course examines the prevalence, experience, causes, and prevention of family violence.
Prerequisites: Soc 101 or Ant 101 or 102 or approval of instructor.

SOC 221. SOCIAL PROBLEMS **Three credits**
A survey of most pressing contemporary social problems and an examination of current theories of social disorganization.
Prerequisite: Soc 101 or Ant 101 or 102 or approval of instructor.

SOC 222. CRIME AND JUVENILE DELINQUENCY **Three credits**
Evaluation of current theories and research into causative factors and sociological implications of criminal and delinquent behavior. Examination of problems, programs, and issues in prevention and treatment of deviant behavior.
Prerequisite: Soc 101 or Ant 101 or 102 or approval of instructor.

SOC 223. DRUGS AND ALCOHOL IN AMERICAN SOCIETY **Three credits**
An examination of drugs and alcohol in American society as a major social problem.
Prerequisite: Soc 101 or approval of instructor.
Offered every other year.

SOC 224. SOCIAL GERONTOLOGY **Three credits**
Considers major findings about the social organization of aging and dying. Reviews history, present and future implications of the rapidly expanding population of elderly.
Prerequisites: Soc 101 or Ant 101 or 102 or permission of the instructor.

SOC 231. FIELDS OF SOCIAL WORK **Three credits**
A survey of the main problems of social work and of agencies and methods that have developed to cope with them. The nature and requirements of the different fields of social work.
Prerequisite: Soc 101 or Ant 101 or 102 or Psy 101 or approval of instructor.

SOC 232. INTERVENTIVE STRATEGIES IN SOCIAL WORK **Three credits**
A survey of the strategies used by social workers, and other professionals in human services, to intervene in the problems manifested by their clients, such as drug and alcohol abuse, child abuse, family violence, mental disorders, mental retardation, poverty, and the crises of the elderly.

SOC 233. SOCIAL WELFARE THEORY AND PRACTICE **Three credits**
This course examines the historical as well as the economic, political, and social factors which underly the institution of social welfare in American society today. The course explores welfare measures such as income maintenance, personal social services, health care provision, anti-poverty schemes, and family and community-building activities. The welfare systems of other nations are studied for purposes of comparative analysis.
Offered every other year.

SOC 251. SOCIOLOGY OF MINORITIES **Three credits**
A theoretical analysis of inter-group tensions and processes of adjustment with special reference to modern racial, national, and religious conflicts.
Prerequisite: Soc 101 or Ant 101 or 102 or approval of instructor.

SOC 261. SOCIOLOGY OF SPORT **Three credits**
An examination of sport from a social and cultural perspective. Emphasis is placed on examining how the institution of sport is a microcosm of American society, reflecting society's major cultural beliefs, and how the organization of sport reflects that of society.
Prerequisite: Soc 101 or approval of instructor.
Offered every other year.

SOC 262. THE SOCIOLOGY OF WORK **Three credits**
An examination of varieties of work with particular emphasis on the industrial and service sectors and the professions. Included is a consideration of labor markets, occupational control, the social division of labor, and the nature of work.
Prerequisite: Soc 101 or Ant 101 or 102 or approval of instructor.

SOC 341. INTRODUCTION TO SOCIAL PSYCHOLOGY **Three credits**
A general survey of the field of social psychology. Social factors in human nature; psychology of individual differences; social interaction; collective behavior; psychology of personality; social pathology.
Prerequisite: Soc 101 or Ant 101 or 102 or Psy 101 or approval of instructor.

SOC 352. SOCIAL STRATIFICATION **Three credits**
A survey of the structure and dynamics of social inequality in American life. Attention is focused on the institutionalization of power arrangements that perpetuate intergenerational patterns of economic, political, and prestige inequalities among collectivities. A special effort is made to compare the consequences of structured social inequality for the very wealthy and the very poor.
Prerequisites: Soc 101 or Ant 101 or 102 or permission of instructor.

SOC 361. MEDICAL SOCIOLOGY **Three credits**
Surveys findings and methods in current applications of sociology to medicine. Includes a consideration of large and small scale social influences on the organization of medical institutions and practices.
Prerequisites: Soc 101 or Ant 101 or 102 or permission of the instructor.

SOC 371. METHODS OF RESEARCH IN SOCIOLOGY **Three credits**
Introduction to sociological research; selected problems of research in social relations; interviewing techniques; questionnaire design and case studies.
Prerequisite: Soc 101 or approval of instructor.

SOC 372. SOCIOLOGICAL ANALYSIS **Three credits**
The systematic critical evaluation of data by means of concepts and methods consistent with the principles of sociology. Both quantitative and qualitative procedures will be employed.
Prerequisite: Soc 101 or Ant 101 or 102 or approval of instructor.

SOC 381. SOCIOLOGICAL THEORY **Three credits**
The aim of the course is to provide the student majoring in sociology, or in one of the related fields, with a historical background necessary for understanding of the current trends in sociology as well as for clarification of its distinct subject matter, problems, and methods.
Prerequisite: Soc 101 or approval of instructor.

SOC 391. SOCIAL SOUNDNESS ANALYSIS I **One credit**
Objectives, method, and design for assessing the societal impact of technological innovations and development projects. The economic, political, and cultural assumptions of project planners and social impact implications of project designs are considered. Students select specific projects for analysis and submit detailed plans for implementing their own social soundness analysis.
Prerequisite: Approval of instructor.

SOC 392. SOCIAL SOUNDNESS ANALYSIS II **Two credits**
Continuation of SOC 391. Implementing social soundness analysis under direction of instructor for projects selected in previous semester. A completed professional quality social soundness report presented and discussed in an open forum is required.
Prerequisite: Successful completion of Soc 391.

SOC 393. PRACTICUM **Six credits**
A supervised practical field experience designed for sociology majors that involves work in a professional setting.

SOC 395-396. INDEPENDENT RESEARCH **One to three credits**
Independent study and research for advanced students in the field of the major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.
Prerequisite: By arrangement with an instructor.

SOC 399. COOPERATIVE EDUCATION **One to six credits**
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)
Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

SOC 198/298/398/498. TOPICS **Three credits**
A study of topics of special interest not extensively treated in regularly offered courses.

SOC 491. SEMINAR **Three credits**
Presentations and discussions of selected themes and issues in sociology.
Prerequisite: Criteria will vary according to content of seminar.

THEATRE ARTS

Associate Professor Reiprich, Chairperson; Adjunct Professor Harrington, Assistant Chair; Professors Emeriti Groh, Holm; Assistant Professor Swanson; Adjunct Faculty Chapline, Eshelman.

Total minimum number of credits required for a major in Theatre Arts leading to the B.A. degree — 120.
Total minimum number of credits required for a minor — 18.

The goal of the Theatre Arts program at Wilkes University is to develop the skills, crafts, and imagination of its students within the liberal arts context. It is strongly recommended that students who major in Theatre take a foreign language. The program is a strong pre-professional curriculum requiring 48 credit hours in the major distributed in the areas of dramatic literature, theatre history, play analysis, acting, directing, scenic design, lighting and production. This broad preparation at the undergraduate level develops a foundation for any theatre specialization, and the best theatre artists – be they actors, directors, designers, or playwrights — almost always have this kind of educational background.

Students having an interest in music and dance may elect courses in either area, or both, thereby further enhancing their preparation for professional work.

The Theatre Arts program is housed in the Dorothy Dickson Darte Center for the Performing Arts, a fully equipped, professional facility, unsurpassed in its ability to provide for the needs of a major program in theatre.

Recommended Course Sequence for a Major in Theatre Arts

First Semester	
Eng 101 Composition I	3
THE 121 Stagecraft	3
THE 131 Acting I or Distribution Requirement	3
Distribution Requirements	6
PE 100 Activity	0
	15

Second Semester	
Eng 102 Composition II	3
THE 132 Speech for the Stage	3
Distribution Requirements	6
THE 190 Theatre Laboratory	1
Free Elective	3
PE 100 Activity	0
	16

Third Semester	
THE 111 Play Structure and Criticism	3
THE 131 Acting I or Distribution Requirement	3
THE 222 Lighting for the Stage	3
Eng 151 Classical Tradition in Literature	3
Distribution Requirement	3
THE 190 Theatre Laboratory	1
	16

Fourth Semester	
THE 221 Scene Design I	3
THE 232 Acting II or Theatre Elective	3
Eng 152 Western Tradition in Literature	3
Distribution Requirements	6
THE 190 Theatre Laboratory	1
	16

Fifth Semester	
THE 211 Theatre History I	3
THE 234 Directing I	3
Dramatic Literature Requirement	3
Distribution Requirements	6
THE 190 Theatre Laboratory	1
	16

Sixth Semester	
THE 212 Theatre History II	3
THE 335 Directing II or Theatre Elective	3
Distribution Requirements	9
THE 190 Theatre Laboratory	1
	16

Seventh Semester	
THE 393 Senior Seminar	3
Dramatic Literature Requirement	3
Distribution Requirement	3
Free Elective	3
THE 190 Theatre Laboratory	1
	13

Eighth Semester	
THE 390 Workshop or Theatre Elective	3
Free Electives	9
	12

Minor in Theatre Arts

Required Course:

THE 121 Stagecraft

Electives:

Five of the following:

THE 111 Fundamentals of Play Structure and Criticism
THE 131 Acting I
THE 132 Speech for the Stage
THE 211 Theatre History I
THE 212 Theatre History II
THE 221 Scene Design
THE 222 Lighting for the Stage
THE 232 Acting II
THE 234 Directing I
THE 335 Directing II

THE 100. APPROACH TO THEATRE **Three credits**

Attention will be directed to the importance of the dramatic imagination in reading and viewing plays, with the objective of developing a critical appreciation of the theatre. Lecture, discussion, demonstration, films, college theatre performances.

THE 111. FUNDAMENTALS OF PLAY STRUCTURE AND CRITICISM **Three credits**

A study of critical techniques in interpreting plays and the application of such techniques to evaluating plays for stage presentation.

Prerequisite: Eng 102.

THE 121. STAGECRAFT **Three credits**

An exploration of the many physical facets of theatrical production by introducing the student to the process of translating the concept of a design into physical actuality and of adapting a production to the requirements of a stage. Class and workshop.

THE 131. ACTING I **Three credits**

Basic acting techniques. Creating a variety of characters for the stage through the use of vocal interpretation, physical movement, improvisation, and theatre games.

THE 132. SPEECH FOR THE STAGE **Three credits**

Instruction and exercises in vocal development for the stage, including diction, delivery, and interpretation. Laboratory sessions.

THE 190. THEATRE LABORATORY **One credit**

A study, through the application of various techniques of different facets of theater such as auditioning, costuming, fencing, make-up, masks, mime, scene study, soliloquy, stage combat, textual analysis, and voice. Guest lecturers, master classes, workshops. Required of all Theatre Arts majors every semester. May be repeated for a total of six hours.

THE 191-192. DEPARTMENT PRACTICUM IN THEATRE PRODUCTION **One to two credits**

The Department Practicum in theatre production may be taken for one to two credits per semester with the total not to exceed six. Students may earn credit for major roles and positions of major responsibility in the above cocurricular activities. Credit for participation in these activities is optional, and voluntary participation (without credit) is also encouraged. The depart-

ment, through the advisor or instructor of the activity, has the authority to approve or reject any contract for credit under this designation. Approval of credit must be by advisor and Department Chairperson.

THE 211. THEATRE HISTORY I **Three credits**
A survey of the historical development and background of theatrical art from ancient times through the seventeenth century.

THE 212. THEATRE HISTORY II **Three credits**
A survey of the historical development and background of theatrical art from the eighteenth century to the present.
Prerequisite: THE 211.

THE 213. CHILDREN'S THEATRE **One to three credits**
Methods of interpreting and performing plays for young audiences. Class projects will evolve into theatrical performances for children.
Prerequisites: THE 121 and 131, or permission of the department.

THE 221. SCENE DESIGN **Three credits**
The nature and function of scenic art with emphasis on contemporary theories and techniques.
Prerequisite: THE 190.

THE 222. LIGHTING FOR THE STAGE **Three credits**
Principles of lighting and the use of these principles in either simple or sophisticated lighting systems. Students will work with instruments and equipment of the lighting technician. Class and workshop.
Prerequisite: THE 190.

THE 232. ACTING II **Three credits**
An introduction to the major theories, aims, and styles of acting through performing various roles and monologues in selected dramatic scenes.
Prerequisite: THE 131.

THE 234. DIRECTING I **Three credits**
An introduction to the principles of directing including play selection, composition, casting, blocking, and rehearsing. Class and workshop.
Prerequisite: THE 190 or departmental permission.

THE 335. DIRECTING II **Three credits**
A study of special problems in directing. Students will prepare a prompt book, critique productions, and direct a one-act play.
Prerequisite: THE 234.

THE 390. THEATRE WORKSHOP **Three credits**
An opportunity to prepare the full production of a short play for an audience. Working closely with members of the faculty, the student will cast and direct the play and supervise the lighting, design, and construction for the production. Required for certification in education.
Prerequisite: Permission of the department.

THE 393. SENIOR SEMINAR **Three credits**
Discussion, research, and exploration of a selected topic in conjunction with a departmental theatre production. Presentations and a research project.

THE 395-396. INDEPENDENT RESEARCH **One to three credits**
Independent study and research for advanced students in theatre under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.

THE 198/298/398. TOPICS **One to three credits**
A study of topics of special interest not extensively treated in regularly offered courses.

THE 399. COOPERATIVE EDUCATION **One to six credits**
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 52 in Bulletin for placement procedures.)
Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

WOMEN'S STUDIES

Women's Studies Coordinating Committee: Professors Gabbert, Kalter, R. Steele, Tuttle.

Total minimum number of credits required for a minor — 18.

Women's Studies is an interdisciplinary program in which students may earn a minor by taking Women's Studies 101 and fifteen additional credit hours in a variety of designated courses offered by various departments and approved by the Women's Studies Coordinating Committee. Courses that may count toward the minor are typically offered in the Departments of Business Administration and Economics, Communications, English, History, Foreign Languages, Nursing, Political Science, and Sociology, among others. As part of the requirement for the minor, students take a seminar or independent study (395, 396 or 397) in which they undertake an extensive research paper or project and present the results in a colloquium of students and faculty participating in the Women's Studies Program.

The minor is designed to add a professionally and personally valuable concentration for students majoring in such areas as business, sociology, English, communications, and nursing, as well as for students in pre-medical and pre-law courses of study.

Students who intend to declare a minor in Women's Studies should take WS 101 before taking more than two other courses offered in the minor.

Students who select the minor should apply to a member of the Women's Studies Coordinating Committee for an advisor who will aid them in the selection of courses.

WS 101. INTRODUCTION TO WOMEN'S STUDIES **Three credits**
Introduction to Women's Studies is a lecture/discussion course. It introduces students to the theoretical assumptions and historical development of feminist thought. It examines a variety of contemporary issues related to race, gender, class, culture, sexuality, the family, reproduction, language and discourse in the light of these theoretical assumptions. Designated Writing Intensive.
Offered every fall semester.

Interdisciplinary Courses

UNIVERSITY-WIDE INTERDISCIPLINARY CORE STUDIES COURSES

The following courses are interdisciplinary offerings which are included in the University's General Education Requirements.

ICS 210. INTERDISCIPLINARY CORE STUDIES IN HERITAGE AND VALUE — **Three credits**

A study of the seminal ideas and issues in world history and cultures, offered in Distribution of Studies Area I, Heritage and Value.

ICS 220. INTERDISCIPLINARY CORE STUDIES IN SCIENCE AND TECHNOLOGY — **Three credits**

A study of fundamental issues and principles in science and technology, offered in Distribution of Studies Area II, The Scientific World.

ICS 230. INTERDISCIPLINARY CORE STUDIES IN SOCIETY AND HUMAN BEHAVIOR — **Three credits**

A participatory discussion of issues and concerns of the social and behavioral sciences, offered in Distribution of Studies Area III, Society and Human Behavior.

ICS 240. INTERDISCIPLINARY CORE STUDIES IN ARTISTIC EXPRESSION — **Three credits**

Special topics in art, music, and theater are explored as a general education experience in Distribution of Studies Area IV, Artistic Expression.

SCHOOL-WIDE INTERDISCIPLINARY COURSES

The School of Science and Engineering

SSE 107. TECHNOLOGICAL SURVIVAL — **Three credits**

An introduction to the discipline and the profession. An interdisciplinary approach to the techniques of analysis and problem solving in professional programs and the sciences with an emphasis on visualization, mathematical topics, modeling, and problem solving using computers. Investigation into the nature of the student's particular discipline including career opportunities, responsibilities of the professional, present challenges, future trends, ethical issues, guest lectures by professionals in the field, and site visits. Special projects and presentations will be required. One hour common lecture, three hour recitation for individual disciplines.

A. Electrical and Computer Engineering
B. Engineering Management
C. Environmental Engineering
D. GeoEnvironmental Sciences
F. Materials Engineering
G. Mechanical Engineering
I. Pharmacy
J. Physics

Prerequisite: A declared major in the School of Science and Engineering.

Personnel of the University

Board of Trustees
Administration
Faculty

Board of Trustees

Officers

EUGENE ROTH, Chairman
RICHARD L. BUNN, Vice Chairman
CONSTANCE McCOLE, Secretary/Assistant Treasurer
RICHARD L. PEARSALL, Treasurer/Assistant Secretary

Trustees

CHRISTOPHER N. BREISETH
RICHARD L. BUNN
FRANK P. CUSCELA
ESTHER B. DAVIDOWITZ
PATRICIA S. DAVIES
J. HAROLD FLANNERY
ROBERT A. FORTINSKY
COLLEEN G. GALLAGHER
JEROME R. GOLDSTEIN
FRANK M. HENRY
STUART HEYDT
BEVERLY B. HISCOX
PAUL E. KANJORSKI
ALLAN P. KIRBY, JR.
DAN F. KOPEN
CONSTANCE McCOLE
CLIFFORD K. MELBERGER
GERALD A. MOFFATT
RICHARD L. PEARSALL
WILLIAM A. PERLMUTH
ROY H. POLLACK
WILLIAM F. RAUB
MARY B. RHODES
ARNOLD S. RIFKIN
HAROLD J. ROSE, JR.
RICHARD M. ROSS, JR.
EUGENE ROTH
ELIZABETH A. SLAUGHTER
STEPHEN SORDONI
RONALD D. TREMAYNE
R. BARRY UBER
NORMAN E. WEISS
WAYNE P. YETTER

Trustees Emeriti

WILLIAM L. CONYNGHAM
ALAN M. GLOVER
DAVID C. HALL
THOMAS H. KILEY
CHARLES H. MINER, JR.
JOSEPH J. PINOLA
MAX ROSENN
JOSEPH J. SAVITZ
WILLIAM J. UMPHRED
JOSEPH A. WIENDL

Administration

CHRISTOPHER N. BREISETH (1984), President
B.A. California, Los Angeles, B. Litt. Oxford, Ph.D. Cornell

RICHARD E. SOURS (1965), Faculty Associate to the President
B.S. Towson, M.S. Michigan State, Ph.D. Virginia

J. MICHAEL LENNON (1992), Vice President for Academic Affairs
A.B. Stonehill College, M.A., Ph.D. Rhode Island

PAUL A. O'HOP, SR. (1985), Vice President for Business Affairs and Auxiliary Enterprises
B.S., M.B.A. George Washington

THOMAS B. HADZOR (1986), Vice President for Development
B.A. Muhlenberg, M.A. Michigan State

SCOTT BODFISH (1989), Director of Institutional Research and Planning, Office of the President
B. Phil. Ohio, M.A. Washington (MO)

MAHMOUD H. FAHMY (1968), Special Assistant to the President for External Affairs
B.A. Alexandria (Egypt), M.A. Columbia, Ph.D. Syracuse

ALFRED S. GROH (1947), Special Assistant to the President for Cultural Affairs
B.A. Syracuse, M.A. Columbia

Academic Affairs

Office of the Vice President for Academic Affairs

J. MICHAEL LENNON (1992), Vice President for Academic Affairs
A.B. Stonehill College, M.A., Ph.D. Rhode Island

BARBARA BELLUCCI (1984), Director, Microcomputer Education
B.S., M.S. Wilkes, Ed.D. Temple

GUSTAV J. STANGLINE (1989), Coordinator of Academic Computing
B.S. Scranton, M.S. Marywood

WAGIHA ABDEL-GAWAD TAYLOR (1969), Dean of Graduate Studies
B.A. Alexandria, M.A. Brown, Ph.D. Clark

BERNARD J. VINOVRSKI (1994), Dean of Student Enrollment Services
B.S., M.S., M.B.A. Wilkes

EMORY GUFFROVICH (1987), Dean of Admissions/Transfer Coordinator
B.S., M.A. Bloomsburg

HELEN BARRETT (1989), Assistant Dean of Admissions
B.A. Wilkes

BRUCE BUNNICK (1991), Assistant Dean of Admissions
B.A., M.S. Wilkes

JOHN J. CHWALEK (1946), Assistant Dean of Admissions/Special Projects
B.S. East Tennessee, M.A. Columbia

JOSEPH A. DeMELFI (1990), Assistant Dean of Admissions/Head Football Coach
B.S., M.Ed. Delta State

JENNIFER ROSS (1993), Assistant Dean of Admissions
B.A. Bloomsburg

FRANK J. SHEPTOCK (1990), Assistant Dean of Admissions/Assistant Football Coach
B.S. Bloomsburg

BERNARD STRITCH (1991), Assistant Dean of Admissions
B.A. Mansfield

ALAN E. ZELLNER (1989), Assistant Dean of Admissions/Assistant Wrestling Coach
B.S. Wilkes

RACHAEL L. LOHMAN (1981), Director of Financial Aid
B.S. Wilkes, M.Ed. Bloomsburg

CHERYL GIBSON (1977), Coordinator, On-Campus Student Employment
B.A., M.S. Wilkes

EDWARD M. MOYER (1986), Assistant Director of Financial Aid
B.S., M.H.A. Wilkes

JOHN F. MEYERS (1967), Registrar/Associate Dean for Academic Affairs
B.A. Minnesota, M.A. Clark, Ph.D. Southern Mississippi

SUSAN A. HRITZAK (1983), Assistant Registrar
B.S., M.B.A. Wilkes

GAIL BRODIE (1981), Recorder

JON LINDGREN (1989), University Librarian
A.B. Michigan, M.A. Indiana, M.L.S. Western Michigan

JAMES P. BERG (1965), Library Systems Manager
A.B. Harvard, B.D., M. Div. Lutheran Seminary, A.M. Pennsylvania

KIMBERLEY M. BUSH (1992), Reference and Bibliographic Instruction Librarian
B.S., M.S.L.S. Clarion

LORNA C. DARTE (1969), Cataloging Librarian
B.A. George Washington, M.S.L.S. Drexel

JOSEPHINE C. FIASCKI (1979), Head of Circulation

FREDERICK J. KROHLE (1965), Head of Reference and Collections Librarian
B.A. Wilkes, M.S.L.S. Drexel

JO McCLAMROCH (1993), Serials Librarian
B.A., M.L.S. Indiana

BRIAN R. SACOLIC (1987), Reference and Database Librarian
B.S., M.S.L.S. Clarion, B.S. Pennsylvania State

HEIDI M. SELECKY (1973), Acquisitions Librarian
B.A. Marywood, M.S.L.S. Villanova

JANE LAMPE-GROH (1969), Dean of Student Affairs
A.B. Rosary College, M.A. Michigan, M.Ed. Virginia

MARK R. ALLEN (1986), Associate Dean of Student Affairs for Student Development
B.S., M.A. SUNY, Oneonta

CAROL A. BOSACK (1989), Coordinator of Cooperative Education and Field Experiences
B.A. Wilkes, M.S. St. Johns

EUGENE DOMZALSKI (1969), Associate Dean of Student Affairs for Career Services
B.S. Wyoming, M.S. Wilkes

DOUGLAS G. LANE (1993), Area Coordinator, Residence Life
B.S. Wilkes

LEIGH E. MAJOR (1987), Assistant Dean of Student Affairs for Residence Life and Community Living
B.A. Wilkes, M.A. Springfield College

AMY L. MAZUR (1993), Coordinator of Student Volunteer Services
B.A. Pennsylvania State

MICHAEL J. NOLFE (1989), Coordinator of Student Activities
B.A. Mansfield, M.S. Shippensburg

DIANE O'BRIEN (1989), Coordinator of Health Services
B.S. Wilkes

PATRICIA PRETTI (1991), Area Coordinator, Residence Life
B.A., M.S. Mansfield

DOROTHY J. PRICE (1989), Coordinator of Career Counseling
B.S., M.B.A. Wilkes

MARK F. SOWCIK (1986), Director of Campus Counseling Service
B.A. King's, M.A. Marywood, Ph.D. Pennsylvania

PAUL S. ADAMS (1979), Dean of Academic Support Services
B.A., M.S. Wilkes, Ph.D. University of Pennsylvania

TO BE ANNOUNCED, Coordinator, Evening, Summer and Weekend Programs

JUDITH FREMONT (1983), Director, Act 101/Wilkes University Learning Center
B.S. Temple, M.S. Nazareth College of Rochester

BARBARA Q. KILLIAN (1989), Academic Coordinator, Project Upward Bound
B.A. Wilkes, M.A., M.P.A. Marywood

BARBARA E. KING (1980), Director, Wilkes TODAY and Coordinator of International Students
B.S. Wilkes

SANDRA RENDINA (1989), Tutor Coordinator, Act 101/Wilkes University Learning Center
B.S. Wilkes

PATRICIA STASKIEL (1986), Counselor, Act 101
B.A. King's

HENRY P. STEUBEN (1974), Director of Evening, Summer and Weekend Programs
B.S. Penn State, M.S. Wilkes

JUDITH A. SULLIVAN (1994), Coordinator of Continuing Education
B.A. Wilkes

ANNE A. THOMAS (1979), Director, Project Upward Bound
B.A., M.S. Wilkes

THOMAS J. THOMAS (1982), Program Counselor, Project Upward Bound
B.S. East Stroudsburg, M.S. Wilkes

JOYCE WONG (1981), Science Specialist, Act 101/Wilkes University Learning Center
B.A. Mankato State College, M.S. University of Illinois

DEBRA ZEHNER (1981), Science Specialist, Act 101/Wilkes University Learning Center
B.S., M.S. Wilkes

Intercollegiate Athletics

PHILIP L. WINGERT (1982), Director of Athletics, Men's Soccer Coach
B.S. SUNY, Cortland, M.S.Ed. Virginia Tech

JOSEPH DeMELFI (1990), Administrative Staff, Football Coach
B.S.Ed., M.S.Ed. Delta State University

TOM DUNSMUIR (1982), Equipment Coordinator

KAREN M. HAAG (1991), Administrative Staff, Basketball Coach, Tennis Coach
B.S. SUNY, Oneonta, M.S. SUNY, Albany

LYLE JONES (1992), Administrative Staff, Assistant Football Coach, Tennis Coach, Intramural Director
B.S. Ferris State

ADELENE MALATESTA (1989), Administrative Staff, Chair - Physical Education Department, Associate Director of Athletics, Field Hockey Coach
B.S. Slippery Rock University, M.Ed. East Stroudsburg University

THOMAS McGUIRE (1988), Sports Information Director
B.A. Communications, Wilkes

JOHN G. REESE (1955), Professor, Wrestling Coach
B.S., M.Ed. Pennsylvania State

JERRY RICKRODE (1992), Administrative Staff, Basketball Coach, Fitness Supervisor
B.A. Skidmore, M.S. Ithica

ROLAND SCHMIDT (1962), Associate Professor, Men's Golf Coach
B.S.Ed. Bloomsburg University, M.S.Ed. University of Scranton

FRANK SHEPTOCK (1990), Administrative Staff, Assistant Football Coach
B.S. Bloomsburg University

KEVIN E. VRABEL (1994), Administrative Staff, Women's Soccer Coach, Softball Coach
B.A. Susquehanna, M.Ed. East Stroudsburg University

Business Affairs and Auxiliary Enterprises

PAUL A. O'HOP, SR., (1985), Vice President, Business Affairs/Auxiliary Enterprises
B.S., M.B.A. George Washington

GERALD J. COOKUS (1990), Chief, Security

EUGENE L. MANGANELLO (1973), Director, Human Resources Management
B.A. Wilkes

KEVIN J. McHALE (1989), Director, Financial Management
B.S. Indiana University (PA)

ERIN OSTROSKI (1988), Bookstore Manager

JOHN PESTA (1981), Director, Campus Support Services
B.A. East Stroudsburg

JOHN P. PLISKA (1992), Director, Computer Support Center
B.S. King's, M.S. Marywood

ROBERT D. SAFFIAN (1994), Staff Architect
B.A. Maryland, R.A. State of Pennsylvania

CHERYL A. SCALESE (1981), Management Analyst
B.A., M.S. Wilkes

JOHN P. ZIKOSKI (1994), Director, Facilities Management

University Development

THOMAS B. HADZOR (1986), Vice President for Development
B.A. Muhlenberg, M.A. Michigan State

SANDRA A. BEYNON (1978), Executive Assistant to the Vice President for Development
B.S. Scranton, M.B.A. Wilkes

BETSY BELL CONDRON (1979), Director of Community Relations
B.S. Skidmore, M.S. Wilkes

MARK (CRAIG) DAVIS (1989), Director of University Relations
B.A. Scranton

BERNADETTE FORNICOLA (1989), Director of Annual Giving
B.S. Scranton

STEPHANIE S. GEYER (1991), Assistant Director, University Relations
B.A. Bloomsburg

WANDA L. McDONOUGH (1988), Assistant Director, Annual Giving
B.A. Bloomsburg

THOMAS R. McGUIRE (1988), Sports Information Director
B.A. Wilkes

GEORGE F. RALSTON (1946), Special Assistant for Alumni
B.A. North Carolina, M.A. Columbia

VAUGHN A. SHINKUS (1993), University Relations, Publications Manager
B.A. Wilkes

ANTHONY J. SHIPULA, II (1985), Director of Alumni
B.S. Wilkes

MARGARET A. WEBSTER (1986), Director of Foundations and Grants Management
B.A. Wilkes

Academic Structure

CHRISTOPHER N. BREISETH — President
J. MICHAEL LENNON — Vice President for Academic Affairs

The School of Business, Society and Public Policy

GARY A. GIAMARTINO — Dean

Chairpersons/Directors	Programs
CYNTHIA J. CHISARICK	Accounting
RICHARD G. RASPEN	Business Administration and Economics
THOMAS J. BALDINO	Political Science/Public Administration
MICHAEL S. GARR	Sociology/Anthropology
WAGIHA TAYLOR	Director, M.B.A. Program
THOMAS M. McCAFFREY	Acting Director, M.H.A. Program
TO BE ANNOUNCED	Director of Small Business Development Center

The School of Liberal Arts and Human Sciences

ROBERT J. HEAMAN — Dean

Chairpersons	Departments
RICHARD A. FULLER	Art
BRADFORD L. KINNEY	Communications
DOUGLAS JAY LYNCH	Education
PATRICIA M. HEAMAN	English
WALTER KARPINICH	Foreign Languages and Literature

Chairpersons	Departments
HAROLD E. COX	History
BRUCE J. REIPRICH, Acting	Music, Theatre, Dance
ANN MARIE KOLANOWSKI	Nursing
LINDA M. PAUL	Philosophy
ADELENE MALATESTA	Physical Education and Health
CARL J. CHARNETSKI	Psychology
Directors	
DOROTHY CRAIG, Acting	Director of the Nursing Learning Laboratory
STANLEY GRAND	Director of Sordoni Art Gallery
BRUCE PHAIR	Director of the Dorothy Dickson Darte Center for the Performing Arts
ROSEMARY WILLIAMS	Director of Teacher Extension Programs

The School of Science and Engineering

UMID R. NEJIB — Dean
BING K. WONG — Associate Dean

Special Programs	
RALPH B. ROZELLE	Dean, Health Sciences
TO BE ANNOUNCED	Dean, Pharmacy
Department Chairs	
DAVID A. AGEE	Aerospace Studies
LESTER J. TUROCZI	Biology
OWEN D. FAUT	Chemistry
AHMAD ARMAND	Electrical and Computer Engineering
DALE A. BRUNS	GeoEnvironmental Sciences and Engineering
LOUISE M. BERARD	Mathematics and Computer Science
JOHN L. OREHOTSKY, Acting	Mechanical and Materials Engineering
ROGER MAXWELL	Physics
Committee Chairs	
KIRK B. BUSH	Admissions & Standards
THY SRINIVASAN	Graduate Programs
Program Coordinators	
TERESE GUMAN-WIGNOT	Biochemistry
STEPHEN J. TILLMAN	Computer Information Systems
JOHN A. KOCH	Computer Science
VASU CHOUDHRY	Electrical Engineering
TO BE ANNOUNCED	Engineering Management & Manufacturing
THOMAS M. WALSKI	Environmental Engineering
JOHN J. JANECEK	Materials Engineering
S. PERWEZ KALIM	Mechanical Engineering
YU BIBBY	Medical and Health Physics
KENNETH A. PIDCOCK	Medical Technology
WALTER A. PLACEK, JR.	Science Education and Certification

Special Activities

MICHAEL A. STEELE	Assistant for Research
BARBARA J. SEFCHIK	Assistant for Communication
KAREN A. MASON	Assistant for Professional Programs & Enrollment
RANDY D. FREAS	Coordinator, Technology & Business Outreach
S. PERWEZ KALIM	Director, CAE&M Center
BRIAN REDMOND	Director, Environmental Quality Center
ALI RAZAVI	Director, Material Processing & Testing Center
SID HALSOR	Director, Ratchford Field Station
KATHLEEN S. ZAYLESKIE	Manager, Biology Stock & Labs Prep
SUSAN GRAVES	Manager, Chemical Stock & Labs Prep
JAMES LENNOX	Manager, ETS Group
BRIAN ORAM	Manager, Water Quality & Giardia Facility

Faculty

In alphabetical order, with date of appointment following the name.

CHRISTOPHER N. BREISETH (1984), Professor of History/President
B.A. California, Los Angeles, B. Litt. Oxford, Ph.D. Cornell

J. MICHAEL LENNON (1992), Professor of English/Vice President for Academic Affairs
B.A. Stonehill, M.A., Ph.D. Rhode Island

* * * * * * * * * * * * * * * * * *

HOLIDAY EVE ADAIR (1990), Assistant Professor of Psychology
B.A., M.A., Ph.D. Akron

DAVID A. AGEE (1992), Professor of Aerospace Studies
B.S. Maryland, M.S. Air Force Institute of Technology

MUNAWAR AHMAD (1988), Associate Professor of Electrical Engineering
B.Sc., M.Sc. Punjab, Ph.D. Virginia Polytechnic

AHMAD ARMAND (1986), Associate Professor of Electrical Engineering
B.Sc., M.Sc. Shiraz University, Iran, Ph.D. University of Southern California

VIJAY K. ARORA (1985), Professor of Electrical Engineering
B.Sc., M.Sc. Kurukshetra University (India), M.S. Western Michigan, M.S., Ph.D. Colorado

BRUCE E. AUERBACH (1988), Associate Professor of Political Science
B.A., M.A. Drew, Ph.D. Minnesota

ALAN L. BAKER (1993), Visiting Assistant Professor of Music and Director of Choral Activities
B.M./B.M.E. Drury College, M.M. Temple, D.M.A. Stanford

THOMAS J. BALDINO (1991), Professor of Political Science
B.A. LaSalle College, M.A. Illinois, Ph.D. Pennsylvania

THOMAS E. BARNARD (1993), Assistant Professor of Environmental Engineering
B.S. University of Vermont, M.S. Utah State, Ph.D. Cornell

ASHIM K. BASU (1994), Professor of Political Science/Public Administration
B.A., M.A. Jadavpue University, Calcutta, M.A., Ph.D. Claremont Graduate School

ANNE HEINEMAN BATORY (1987), Associate Professor of Business Administration
B.A. Wilkes, M.S., Ph.D. Maryland

BONNIE C. BEDFORD (1990), Assistant Professor of English
B.A. Waynesburg, M.A., Ph.D. SUNY, Binghamton

JOSEPH T. BELLUCCI (1967), Professor of Psychology
B.S. Scranton, M.Ed., Ed.D. Lehigh

LOUISE McNERTNEY BERARD (1980), Associate Professor of Mathematics/Computer Science
B.S. King's, Ph.D. Brown

JAMES P. BERG (1965), Assistant Professor of History
B.A. Harvard, B.D., M.Div. Lutheran Seminary, M.A. Pennsylvania

JOEL BERLATSKY (1970), Professor of History
B.A. Carleton, M.A. Brown, Ph.D. Northwestern

YU W. BIBBY (1991), Assistant Professor of Physics
B.S. Beijing Science and Engineering, M.S., Ph.D. Drexel

TOM BIGLER (1986), Professor of Communications
B.A. Wilkes

JEAN R. BOHLANDER (1982), Associate Professor of Nursing
B.S. Wilkes, M.S. Misericordia

ROBERT W. BOHLANDER (1979), Associate Professor of Psychology
B.A. Lebanon Valley, Ph.D. Rochester

SHARON BOWAR (1990), Assistant Professor of Art
B.A. Shepherd College, B.F.A., M.A., M.F.A. New Mexico

DAVID E. BRADBURY (1990), Assistant Professor of Communications
B.A. Heidelberg, M.A. West Virginia, Ph.D. Temple

DONALD R. BRAND (1991), Associate Professor of Political Science
B.A. Williams, M.A., Ph.D. Chicago

KENNETH A. BROADT (1980), Associate Professor of Accounting
B.S. Bloomsburg, M.S. Bucknell, C.P.A. State of Pennsylvania

RICHARD LEE BROWN (1993), Assistant Professor of Music
B.Mus.Ed. Morehead State, M.Mus.Ed. Bowling Green State, Ph.D. Michigan State

DALE A. BRUNS (1991), Professor of Earth and Environmental Sciences
B.S. Xavier, M.S. Arizona State, Ph.D. Idaho State

KIRK B. BUSH (1990), Associate Professor of Electrical Engineering
B.S.E.E. Brigham Young, M.S.E.E. Syracuse, Ph.D. SUNY, Binghamton

JEROME W. CAMPBELL (1979), Associate Professor of Music
B.M., M.M. Boston

ROBERT S. CAPIN (1959), Professor of Accounting and President *Emeritus*
B.S. Wilkes, M.B.A. Lehigh, Doctor of Humane Letters Wilkes

JAMES MICHAEL CASE (1978), Associate Professor of Earth and Environmental Sciences/Biology
B.S. Duke, M.S., Ph.D. Dalhousie, Halifax

LEONA CASTOR (1987), Associate Professor of Nursing
B.S. Misericordia, M.S. Pennsylvania, M.S.N. Bloomsburg, Ed.D. Pennsylvania State

CARL J. CHARNETSKI (1976), Professor of Psychology
B.A. Wilkes, M.A., Ph.D. Temple

CYNTHIA J. CHISARICK (1981), Associate Professor of Accounting
B.S. Wilkes, C.P.A. State of Pennsylvania, M.B.A. Scranton

YUNSOO CHOE (1987), Associate Professor of Electrical Engineering
B.S. Seoul National University, M.S., Ph.D. Texas A&M

VASUNDHRA CHOUDHRY (1984), Associate Professor of Electrical Engineering
B.S. Delhi, M.S., Ph.D. Indian Institute of Technology Kanpur

HAROLD E. COX (1963), Professor of History/GeoEnvironmental Sciences and Engineering
B.A. William and Mary, M.A., Ph.D. Virginia

LORNA C. DARTE (1969), Associate Professor of Library Science
B.A. George Washington, M.S. Drexel Institute of Technology

JAMES G. DeCOSMO (1962), Associate Professor of Mathematics/Computer Science
B.S. West Chester, M.S. Adelphi

SUZANNE M. DRUFFNER (1982), Associate Professor of Nursing
B.S. Georgetown, M.S. Pennsylvania

JANE M. ELMES-CRAHALL (1985), Associate Professor of Communications
B.A. Bloomsburg, M.A. Ohio, Ph.D. Pittsburgh

THEODORE J. ENGEL (1966), Associate Professor of Business Administration
B.B.A., M.A. Miami

MAHMOUD H. FAHMY (1968), Professor of Education/Special Assistant to the President for External Affairs
B.A. Alexandria, Egypt, M.A. Columbia, Ph.D. Syracuse

OWEN D. FAUT (1967), Professor of Chemistry/Materials Engineering
B.S. Muhlenberg, Ph.D. M.I.T.

DARIN E. FIELDS (1993), Assistant Professor of English
B.A. Arizona, M.A., Ph.D. Delaware

BENJAMIN F. FIESTER, JR., (1956), Professor of English
B.A. Wilkes, M.A. Bucknell, Ph.D. Pennsylvania State

ELLEN RENNIE FLINT (1990), Assistant Professor of Music
B.M. Virginia Commonwealth, M.M. Rice, Ph.D. Maryland

RICHARD A. FULLER (1969), Professor of Art
B.S. New York, M.A. Columbia

PAULA S. GABBERT (1993), Assistant Professor of Computer Information Systems/Engineering Management
B.A. Goucher, M.S., Ph.D. Virginia

MICHAEL S. GARR (1984), Associate Professor of Sociology/Anthropology
B.A., M.A. Ohio, Ph.D. Indiana

JAMAL GHORIESHI (1984), Associate Professor of Mechanical Engineering
B.S., M.S., Ph.D. SUNY, Buffalo

GARY A. GIAMARTINO (1993), Dean, School of Business, Society and Public Policy/Professor of Business Administration
A.B. SUNY, Fredonia, M.A. Western Kentucky, Ph.D. Vanderbilt

JOHN B. GILMER, JR. (1991), Assistant Professor of Engineering
B.S. United States Naval Academy, M.S.E.E., Ph.D. Virginia Polytechnic Institute

THERESA GRABO (1980), Associate Professor of Nursing
B.S. SUNY, Buffalo, M.P.A. Marywood, M.S. SUNY, Binghamton, Ph.D. Pennsylvania

TERESE GUMAN-WIGNOT (1989), Assistant Professor of Biochemistry
B.A., Ph.D. Lehigh

SID HALSOR (1987), Associate Professor of Geology
B.S. Oregon, M.S., Ph.D. Michigan Technological University

WILBUR F. HAYES (1967), Associate Professor of Biology
B.A. Colby, M.S., Ph.D. Lehigh

PATRICIA M. HEAMAN (1966), Associate Professor of English
B.A. Wilkes, M.A., Ph.D. Pennsylvania

ROBERT J. HEAMAN (1969), Dean, School of Liberal Arts and Human Sciences/Associate Professor of English
B.A. Detroit, M.A., Ph.D. Michigan

LEVERE C. HOSTLER (1967), Professor of Physics/Electrical and Computer Engineering
B.S., M.I.T., M.S., Ph.D. Stanford

DENNIS P. HUPCHICK (1990), Assistant Professor of History
B.A., M.A., Ph.D. Pittsburgh

HENRY O. JACOBY (1990), Assistant Professor of Philosophy
B.A., M.A. Ohio State, Ph.D. Southern California

VICTORIA JAÉN-ANDRÉS (1990), Assistant Professor of Spanish
Licenciatura Salamanca, M.A., Ph.D. Massachusetts, Amherst

JOHN J. JANECEK (1982), Assistant Professor of Materials Engineering
B.S. Wisconsin, M.S. Illinois

EDWIN L. JOHNSON (1966), Associate Professor of Education
B.A. Wilkes, M.A. Bucknell

S. M. PERWEZ KALIM (1988), Associate Professor of Mechanical Engineering
B.S. Mamachi, M.S., Ph.D. Kansas

VALERIE G. KALTER (1991), Assistant Professor of Biology
B.A. Northwestern, Ph.D. Iowa

WALTER KARPINICH (1975), Professor of Foreign Languages
B.S., M.A. Temple, Ph.D. Ukrainian Free University, Munich

THOMAS N. KASKA (1966), Professor of English/Electrical and Computer Engineering
B.A. Wilkes, M.A., Ph.D. Duquesne

STANLEY B. KAY (1964), Professor of Philosophy
B.A. Case Western Reserve, M.A. Michigan, Ph.D. Ohio State

BRADFORD L. KINNEY (1973), Professor of Speech
B.A. Florida Southern, M.A. Indiana, Ph.D. Pittsburgh

KENNETH M. KLEMOW (1982), Associate Professor of Biology/GeoEnvironmental Sciences and Engineering
B.S. Miami, M.S., Ph.D. SUNY, Syracuse

JOHN A. KOCH (1976), Professor of Computer Science
B.S. Bucknell, M.S., Ph.D. Illinois

ANN MARIE KOLANOWSKI (1979), Associate Professor of Nursing
B.S. Misericordia, M.S. Pennsylvania State, Ph.D. New York University

FREDERICK J. KROHLE (1965), Associate Professor of Library Science
B.A. Wilkes, M.S. Drexel Institute of Technology

JEROME KUCIRKA (1980), Associate Professor of Electrical Engineering/Physics
B.S. Wilkes, M.S., Ph.D. Drexel

THURAI KUGENDRAN (1988), Assistant Professor of Mathematics/Computer Science
B.S. University of Peradeniya (Sri Lanka), M.S., Ph.D. Illinois

LAWRENCE T. KUHAR (1989), Assistant Professor of English
B.A., M.A. Duquesne, Ph.D. Maryland

SUSAN M. LANG (1994), Assistant Professor of English
B.A. Ohio State, M.A., Ph.D. Emory

CRAIG A. LATSHAW (1992), Visiting Assistant Professor of Accounting
B.A. Gettysburg, C.P.A. State of Pennsylvania, M.B.A. Kutztown

DAVID A. LATZKO (1993), Assistant Professor of Economics
A.B. Michigan, M.A., Ph.D. Maryland

VEE MING LEW (1993), Assistant Professor of Mathematics/Computer Science
B.S. UC Santa Barbara, M.S., Ph.D. Cornell

ALICIA LINDGREN (1990), Visiting Assistant Professor of English
B.A. Central Michigan, M.A. SUNY, Potsdam

ANTHONY L. LIUZZO (1990), Associate Professor of Business Administration
B.S. Fordham, J.D. St. John's, M.B.A., M.Phil., Ph.D. New York University

FERDINAND LIVA, JR. (1992), Assistant Professor of Music
B.M. Peabody, M.M. Temple

BARBARA SAMUEL LOFTUS (1991), Assistant Professor of Business Administration
B.S. Susquehanna University, M.B.A. Scranton, Ph.D. Syracuse

DOUGLAS JAY LYNCH (1990), Associate Professor of Education
B.A. Colorado, M.S. Wisconsin, M.S., Ph.D. Massachusetts

ROGER MAXWELL (1984), Associate Professor of Physics/Mechanical Engineering
B.A. Buffalo, Ph.D. Syracuse

THOMAS M. McCAFFREY (1990), Associate Professor of Health Care Administration
B.S. Scranton, J.D. Boston College, M.H.A. Michigan

MARY ANN MERRIGAN (1987), Assistant Professor of Nursing
B.S. SUNY, Binghamton, M.S. Pennsylvania State University

SAMUEL MERRILL, III, (1973), Professor of Mathematics/Computer Science
B.A. Tulane, M.S. Pennsylvania State, M.A., Ph.D. Yale

JAMES L. MERRYMAN (1989), Associate Professor of Anthropology
B.A. Nebraska Wesleyan, M.A. SUNY-Binghamton, Ph.D. Northwestern

GAY F. MEYERS (1970), Associate Professor of Physical Education/Education
B.S. Lock Haven, M.S. Wilkes

JOHN F. MEYERS (1967), Registrar/Associate Dean for Academic Affairs/ Assistant Professor of History
B.A. Minnesota, M.A. Clark, Ph.D. Southern Mississippi

CLIFFORD B. MIRMAN (1991), Assistant Professor of Mechanical Engineering
B.S. Rochester, M.S., Ph.D. Illinois

PRAHLAD N. MURTHY (1993), Visiting Assistant Professor of Environmental Engineering
B.E. Bangalore University, India, M.E. Anna University, India, Ph.D. Texas A&M

JOHN H. NATZKE (1973), Associate Professor of Sociology/Anthropology
B.A. Wisconsin State, M.A., Ph.D. Western Michigan

UMID R. NEJIB (1965), Dean, School of Sciences and Engineering/Professor of Electrical Engineering
B.S. Baghdad, M.S., Ph.D. Carnegie-Mellon

DANA ALEXANDER NOLFE (1992), Visiting Assistant Professor of Communications
B.A. Queens, M.A. New York University

PAUL A. O'HOP, SR. (1985), Vice President for Business Affairs and Auxiliary Enterprises/Associate Professor of Business Administration
B.S., M.B.A. George Washington

JOHN L. OREHOTSKY (1971), Professor of Materials Engineering/Physics
B.S. M.I.T., M.S. Polytechnic Institute of Brooklyn, Ph.D. Syracuse

LINDA M. PAUL (1989), Assistant Professor of Philosophy
B.A. Guilford, Ph.D. Maryland

MERLE J. PEPER (1989), Associate Professor of Business Administration
B.B.A. McMurry (TX), M.B.A. Southeastern Louisiana, Ph.D. Louisiana State

JOHN S. PHILLIPS (1991), Associate Professor of Chemistry
B.A. Western Maryland, Ph.D. Purdue

KENNETH A. PIDCOCK (1988), Associate Professor of Biology
B.S. Millersville, M.S., Ph.D. Lehigh

WALTER A. PLACEK, JR., (1969), Professor of Physics/Education
B.S. Wilkes, M.Ed. Pennsylvania State, Ph.D. Pennsylvania

DIANE M. POLACHEK (1986), Associate Professor of Education
B.A., M.S. Wilkes, M.S. California, Ed.D. Lehigh

HOWARD R. PRICE (1994), Associate Professor of Materials Engineering
B.S. Virginia Polytechnic, M.Engr., Ph.D. Old Dominion

RICHARD G. RASPEN (1967), Associate Professor of Business Administration
B.S., M.B.A. Wilkes, M.Ed. Bloomsburg, Ph.D. Pennsylvania

ALI RAZAVI (1984), Associate Professor of Materials Engineering
B.S. Tehran, Iran, M.S. Manchester, England, Ph.D. Drexel

BRIAN T. REDMOND (1976), Professor of Geology
B.S., M.S. Michigan State, Ph.D. Rensselaer Polytechnic

JOHN G. REESE (1955), Professor of Physical Education
B.S., M.Ed. Pennsylvania State

BRUCE J. REIPRICH (1980), Associate Professor of Music
B.M., M.A. Eastman School of Music, Ph.D. Iowa

MARIANNE M. REXER (1990), Assistant Professor of Accounting
B.S. Wilkes, C.P.A. State of Pennsylvania, M.S. Bryant

JAMES P. RODECHKO (1968), Professor of History
B.A. Hofstra, M.A., Ph.D. Connecticut

RALPH B. ROZELLE (1962), Dean of Health Sciences/Professor of Chemistry
B.S. Wilkes, Ph.D. Alfred

DORIS B. SARACINO (1960), Associate Professor of Physical Education
B.S., M.S. East Stroudsburg

MARY ANN SAUERAKER (1983), Associate Professor of Nursing
B.S. Wilkes, M.S., D.Ed. Pennsylvania State

ROLAND C. SCHMIDT, JR., (1962), Associate Professor of Physical Education
B.S. Bloomsburg, M.S. Scranton

JUDITH K. SCHREIBER (1974), Associate Professor of Nursing
B.S. Wilkes, M.S. Pennsylvania, M.S. Scranton

RONALD D. SCHWARTZ (1990), Associate Professor of Business Administration
B.A. Case Western Reserve, M.A. John Carroll, Ph.D. Akron

ROBERT D. SEELEY (1989), Associate Professor of Economics
B.A. Franklin and Marshall, Ph.D. Maryland

KUO-KANG SHAO (1966), Professor of History
B.A. Taiwan, M.S., Ph.D. Pennsylvania

RICHARD E. SOURS (1965), Professor of Mathematics/Computer Science
B.S. Towson, M.S. Michigan State, Ph.D. Virginia

THYAGARAJAN SRINIVASAN (1985), Associate Professor of Electrical Engineering
B.E., M.Sc (Engg) India, M.S. Oklahoma State, Ph.D. Pennsylvania State, P.E. (Elec)

MICHAEL A. STEELE (1989), Assistant Professor of Biology
B.S. Millersville, Ph.D. Wake Forest

ROBERT O. STEELE (1990), Assistant Professor of French
B.A., B.S., M.A., Ph.D. Michigan State

WILLIAM H. STERLING (1976), Professor of Art
B.A. William and Mary, Ph.D. Iowa

ROBERT D. STETTEN (1968), Associate Professor of Psychology
B.A., Ph.D. Lehigh, M.S., M.A. Iowa

JAMES A. STEWART (1994), Assistant Professor of Aerospace Studies
B.S. Wayland Baptist, M.S. Troy State

WILLIAM R. STINE (1965), Professor of Chemistry
B.S. Union, Ph.D. Syracuse

FREDERICK J. SULLIVAN (1993), Assistant Professor of Mathematics/Computer Science
B.S., M.S., Ph.D. Louisiana State

JOHN FARLEY SWANSON (1990), Assistant Professor of Theatre
B.A. Adams State, M.A. Denver, M.F.A. School of the Arts (N.C.)

WILLIAM J. TARUTIS, JR. (1993), Visiting Assistant Professor of Ecology
B.S. Wilkes, M.S., Ph.D. Pennsylvania State

WAGIHA ABDEL-GAWAD TAYLOR (1969), Professor of Economics/Dean of Graduate Studies
B.A. Alexandria, M.A. Brown, Ph.D. Clark

SHARON G. TELBAN (1975), Associate Professor of Nursing
B.S., M.S. Wilkes, M.S., D.Ed. Pennsylvania State

LEE C. TERRY (1968), Professor of English
B.A. Southern Methodist, Ph.D. Texas

STEPHEN J. TILLMAN (1970), Professor of Computer Information Systems
B.S. Brown, M.S. Lehigh, Ph.D. Brown

JENNIFER S. TURNEY (1992), Assistant Professor of Computer Science
B.A. Mills, M.S., Ph.D. Cornell

LESTER J. TUROCZI (1972), Professor of Biology
B.A., M.S., Ph.D. Rutgers

ROBERT C. TUTTLE (1989), Assistant Professor of Sociology
B.A. Kansas, M.A., Ph.D. Notre Dame

THOMAS M. WALSKI (1992), Associate Professor of Environmental Engineering
A.B. King's, M.S., Ph.D. Vanderbilt

L. DOUGLAS WERDER (1993), Assistant Professor of Aerospace Studies
B.A. Columbia College, M.A. Great Falls

ROSEMARY WILLIAMS (1987), Associate Professor of Education/Director of Teacher Extension Programs
B.A., M.S. Wilkes, D.Ed. Pennsylvania State

PHILIP WINGERT (1986), Assistant Professor of Physical Education/Athletic Director
B.S. SUNY, Cortland, M.E. Virginia Polytechnic

BING K. WONG (1968), Associate Dean, School of Science and Engineering/Professor of Mathematics/Computer Science
B.A. Kansas State at Pittsburgh, M.A., Ph.D. Illinois

CAROL W. ZACK (1983), Associate Professor of Nursing
B.S. Bloomsburg, M.S. Wilkes, M.S., D.Ed. Pennsylvania State

BRIDGETTE W. ZIELINSKI (1987), Assistant Professor of Nursing
B.S. Wilkes, M.S.N. SUNY, Binghamton

President Emeritus

(with date of emeritus recognition in parenthesis)

ROBERT S. CAPIN
Professor of Accounting, and President from 1975-1984. (1984) M.B.A. Lehigh, Doctor of Humane Letters Wilkes

Faculty Emeriti

(with date of emeritus recognition in parenthesis)

FRANK G. BAILEY (1987)
Associate Professor of Physics, Emeritus, Ph.D. Polytechnical Institute of Brooklyn

MICHAEL J. BARONE (1980)
Associate Professor of Education, Emeritus, M.S. Bucknell

FREDERIC E. BELLAS (1991)
Professor of Physics, Emeritus, Ph.D. Pennsylvania State

JAMES J. BOHNING (1990)
Professor of Chemistry, Emeritus, Ph.D. Northeastern

RICHARD B. CHAPLINE (1987)
Professor of Music, Emeritus, B.S., M.S. Juilliard

FRANCK G. DARTE (1988)
Professor of Education, Emeritus, Ed.D. Pennsylvania

ROBERT DeYOUNG (1992)
Associate Professor of Economics, Emeritus, M.A. Columbia

FRANCIS J. DONAHOE (1985)
Professor of Physics, Emeritus, Ph.D. Pennsylvania

JEAN M. DRISCOLL (1986)
Professor of Political Science, Emerita, Ph.D. Northwestern

BOYD L. EARL (1994)
Associate Professor of Mathematics/Computer Science, Emeritus, M.S. Bucknell

WELTON G. FARRAR (1989)
Professor of Economics Emeritus, M.S. Pennsylvania

HERBERT GARBER (1988)
Associate Professor of Music, Emeritus, Ed.D. Columbia

GEORGE M. GERA (1989)
Associate Professor of Business Administration Emeritus, M.A. Columbia

ALFRED S. GROH (1988)
Associate Professor of English and Theatre Arts, Emeritus, M.A. Columbia

STANLEY S. GUTIN (1992)
Professor of English, Emeritus, Ph.D. Pennsylvania

EUGENE L. HAMMER (1986)
Professor of Education, Emeritus, Ed.D. Columbia

KLAUS HOLM (1986)
Associate Professor of Theatre Arts, Emeritus, M.F.A. Yale

JOSEPH H. KANNER (1992)
Assistant Professor of Psychology, Emeritus, M.A. New School for Social Research

BRONIS KASLAS (1976)
Professor of History, Emeritus, Ph.D. Strasbourg

CHARLOTTE V. LORD (1976)
Professor of English, Emerita, Ph.D. Pennsylvania

HILDA A. MARBAN (1986)
Professor of Foreign Languages, Emerita, Ph.D. Havana, Ph.D. Virginia

RUTH W. McHENRY (1979)
Professor of Nursing, Emerita, M.A. Columbia

THOMAS J. MORAN (1992)
Professor of Communications, Emeritus, M.S. Columbia

LEOTA NEVIL (1980)
Assistant Professor of Library Science, Emerita, M.S. Wilkes

ROBERT E. OGREN (1986)
Professor of Biology, Emeritus, Ph.D. Illinois

GEORGE F. RALSTON (1986)
Dean of Student Affairs, Emeritus, M.A. Columbia

CHARLES B. REIF (1980)
Professor of Biology, Emeritus, Ph.D. Minnesota

THOMAS R. RICHARDS (1980)
Professor of Mathematics, Emeritus, M.S. Bucknell

ROBERT C. RILEY (1991)
Professor of Psychology, Emeritus, Ph.D. Pennsylvania State

PHILIP L. RIZZO (1987)
Professor of English, Emeritus, Ph.D. Pennsylvania

RUTH T. ROBERTS (1976)
Instructor of English, Emerita, B.A. Goucher

FRANCIS J. SALLEY (1991)
Professor of Chemistry, Emeritus, M.S. Pennsylvania

JOSEPH H. SALSBURG (1989)
Associate Professor of Mathematics and Computer Science, Emeritus, M.A. Columbia

ROSENDO E. SANTOS, JR. (1992)
Associate Professor of Music, Emeritus, M.M. Catholic University of America

HERBERT B. SIMON (1992)
Professor of Art, Emeritus, M.A. New York

HOWARD A. SWAIN, JR. (1992)
Professor of Chemistry, Emeritus, Ph.D. Pennsylvania

CROMWELL E. THOMAS (1976)
Associate Professor of Engineering, Emeritus, B.S. Washington and Lee

PHILIP R. TUHY (1993)
Assistant Professor of Political Science, Emeritus, M.G.A. Pennsylvania

ROY E. WILLIAMS (1980)
Professor of Philosophy, Emeritus, Ph.D. Drew

Index

(A)

Academic Honesty 13, 59
Academic Honors 58
Academic Ineligibility 58
Academic Officers 321
Academic Probation 58
Academic Programs 66
Academic Progress 32, 58
Academic Requirements . . 48, 49, 50, 51, 60
Academic Standards Committee 58, 59
Accounting 66
Accreditation 14
Act 101 Program 44
Administrative Personnel 321
Admissions 18
  Acceptance 19
  Advanced Placement 21
  Applications 18
  College Level Examination Program Subject Credits 22
  Deposit 19
  International Students 19
  Interviews 19
  Readmission 20
  Tests 18
  Transfer Students 20
Adult Education 21, 22, 26, 33, 53, 54
Advanced Course Standing 21
Advanced Placement 21
Advisement 13, 41, 42
Aerospace Engineering 70
Aerospace Studies 71
Aid 32
  Appeals 32
  Refunds 30, 31
  Reinstatement 32
Air Force ROTC 71
Air Force ROTC Scholarships 72
Allen P. Kirby Center for Free Enterprise and Entrepreneurship 15
Allied Health Programs 211
Allopathic Medicine 204
Alumni Discount 30
Anthropology 75
Appeals 32, 58
Applied and Engineering Sciences 77
Army ROTC 255
Art 80
Art Gallery 15
Athletics 8, 39
Attendance 55
Auditing Courses 26, 55

(B)

Baccalaureate Programs 47
Bachelor of Arts 47, 51
Bachelor of Business Administration 47, 51
Bachelor of Fine Arts 47, 51
Bachelor of Music 47, 51
Bachelor of Science 47, 51
Band 258
Biochemistry 87
Biology 89
Board of Trustees 320
Bookstore 44
Business Administration 97

(C)

Calendar 46
Career Resource Library 43
Career Services (Roth Center) 33, 43
Center for the Performing Arts 14, 15
Certification Requirements 51, 80, 158, 258
Challenge Examinations 22, 26
Change of Major 55
Chemistry 110
Chorus 258
Class Attendance 55
Class Standing 32, 58, 59, 60
CLEP (College Level Examination Program) 22
Clubs 38
Commencement 46
Communications 117
Commuter Council 39
Computer Information Systems 128
Computer Science 131
Computing Facilities 15
Concert and Lecture Series 40
Continuing Education 14, 54
Conyngham Student Center 16
Cooperative Education Program 52
Counseling 42
Course Credits 57
Course Load 55
Course Numbering 47
Course Requirements and Descriptions 61

Index

Accounting 66
Aerospace Engineering 70
Aerospace Studies (ROTC) 71
Allopathic Medicine 204
Anthropology 75
Applied and Engineering Sciences 77
Art 80
Biochemistry 87
Biology 89
Business Administration 97
Chemical Engineering 109
Chemistry 110
Civil Engineering 116
Communications 117
Computer Information Systems 128
Computer Science 131
Dance 138
Dentistry 208
Earth and Environmental Sciences . . . 141
East European and Russian Studies . . . 150
Economics 152
Education 158
Electrical Engineering 165
Elementary Education 158
Engineering Management 173
English 177
Environmental Engineering 186
French 191, 194
German 191, 196
Health Information Management 211
Health Sciences 201
Hebrew 198
History 220
Individualized Studies 226
Industrial Engineering 226
Interdisciplinary Core Studies 318
International Studies 227
Italian 198
Japanese 198
Latin 198
Materials Engineering 230
Mathematics 237
Mechanical Engineering 247
Medical Technology 253
Military Science 255
Music 258
Music Education 51, 258
Nursing 270
Occupational Therapy 213
Optometry 208, 209
Osteopathic Medicine 206
Pharmacy 276
Philosophy 278
Physical Education 283
Physical Therapy 214
Physics 286
Podiatric Medicine 209
Polish 198
Political Science 295
Pre-Law 302
Pre-Doctoral Programs 208
Pre-Medical Programs 201
Pre-Pharmacy 219
Psychology 303
Public Administration 295
Russian 197
Sociology 307
Spanish 191
Speech 117
Theatre Arts 313
Ukrainian 198
Veterinary Medicine 208
Women's Studies 317
Credit Balances 27
Cultural Activities 14, 39
Curriculum 47

(D)

Damage Deposit 26
Dance 138
Day Care Service 44
Dean's List 58
Deans' Offices 42
Debate 10
Deferred Payment Plans 29
Degree Honors 60
Degree Requirements . . . 47, 48, 49, 50, 51, 52, 60
  Bachelor of Arts Degree 47, 51
  Bachelor of Business Administration Degree 47, 51, 97
  Bachelor of Fine Arts Degree . . 47, 51, 80
  Bachelor of Music Degree 47, 51, 258
  Bachelor of Science Degree 47, 51
Dentistry Program 208
Distribution of Studies 48, 49
Dormitories (Residence Halls) 7, 16, 26, 38
Dorothy Dickson Darte Center for the Performing Arts 14, 15

Index

Dorothy Dickson Darte Music Building 15
Double Major 53

(E)

Earth and Environmental Sciences 141
East European and Russian Studies 150
Economics 152
Education 158
  Art 51, 80, 158
  Certification 51, 158
  Elementary 51, 158
  Music 51, 158, 258
  Secondary 158
Educational Program 46
Electives 47, 52
Electrical Engineering 165
Employment 33, 43
Engineering:
  Aerospace Engineering 70
  Applied and Engineering Sciences 77
  Chemical Engineering 109
  Civil Engineering 116
  Electrical Engineering 165
  Engineering Management 173
  Environmental Engineering 186
  Industrial Engineering 226
  Materials Engineering 230
  Mechanical Engineering 247
English 177
Evening Program 21, 22, 26, 33, 53, 54
Evening School Discounts 30
Evening, Weekend, & Summer Programs 21, 22, 26, 33, 53, 54
Expenses 26, 33
Experiential Learning 23
Extracurricular Activities 8, 10, 39, 40

(F)

Faculty 328
  Emeriti 336
Family Educational Rights and Privacy Act 56
Fees 26, 27
  Application 19, 26
  Auditing Courses 26
  Challenge Examinations 22, 27
  General University 26
  Graduation 27, 46, 60
  Installment Payment Plan 28
  Laboratory 26, 27
  Late Registration 27
  Medical Technology 27
  Music 27
  Orientation 27, 41
  Part-time Student 26
  Payment 28, 60
  Property Damage 26
  Refunds 30, 31
  Residence Halls 26
  Room and Board 26
  Student Activities 26
  Tuition 26
Financial Aid Director 32
Financial Aid Office 32
Financial Assistance 32
  Deferred Payment Plans 29
  Employment 33
  Grants 33
  Loans 28, 33
  Scholarships 32
  State Scholarships 33
  Tuition Discounts 30
  Veterans 33
  Work-Study 33
Foreign Languages 191
French 191, 194
Freshman Orientation 27

(G)

General Education Requirements 12, 47, 48, 50
Geology 142
German 191, 196
Goals of the Educational Program 11, 46
Grade Point Average 57, 60
Grades 56, 57
Graduate Program 11, 13, 54
Graduation Requirements 60
Grants 33
Guidance 42
Guthrie Scholars 205
Gymnasium 16

(H)

Health Information Management . . 211, 212
Health Sciences 201
Health Service 42
Hebrew 198
Henry Gymnasium 16

Index

History 220
Honors 50, 58, 60
  in Biology 91
  in Engineering 78, 166, 174, 187, 231, 248
  in English 178
Honor Societies 39, 165
Housing 7, 26, 38

(I)

Incompletes 56
Individualized Studies 226
Ineligibility 58
Installment Payment Plan 28
Interdisciplinary Core Studies 49, 318
Interdisciplinary Courses 318
International Students 19, 41
International Studies 227
Internships 66
Inter-Residence Council 39
Intersession 26, 29, 47
Interviews 19
Intramurals 39
Italian 198

(L)

Latin 198
Law 302
Learning Center 43
Library 14
Life-long Learning 23
Loans 28, 33

(M)

Major 41, 47, 51, 60
  Change of Major 55
  Double 53
Marts Center 16
Materials Engineering 230
Mathematics 237
Meals 26, 38
Mechanical Engineering 247
Medical and Health Physics 289
Medical Programs 201
Medical Technology 253
Military Experience 22
Military Science 255
Minor 47, 52, 60
Music 258
Music Education 51, 258, 269
Music Scholarship 32

(N)

Nursing 18, 20, 270
Nursing Student Loans 28

(O)

Occupational Therapy 211, 213
Optometry Program 208, 209
Oral Presentation Option 48
Orientation for New Students 27, 41, 55
Osteopathic Medicine 206
Overloads 26, 55

(P)

Part-time 21, 26, 29, 33, 53, 54
Payments 28
Pharmacy 276
Philosophy 278
Physical Education 283
Physical Therapy 211, 214
Physics 286
Podiatric Medicine Program 208, 209
Polish 198
Political Science 295
Pre-Doctoral Programs 208
Pre-Law 302
Pre-Medical Programs 201
Pre-Pharmacy 211, 219, 276
Probation and Dismissal 58
Psychology 303
Public Administration 295

(R)

Readmission 20
Refunds 30, 31
Registered Nurses 22
Registration 41, 55
Resident Assistants 16
Residence Halls 7, 16, 26, 38
Residence Life Office 16, 38
Room and Board 26, 38
Room Rent 26
ROTC (Air Force) 71
ROTC (Army) 255
Russian 197
Russian and East European Studies 150

(S)

Scholarships 32, 35
School of Business, Society and Public Policy 61, 62

Index

School of Liberal Arts and Human Sciences 61, 63
School of Science and Engineering . . . 61, 64
School-wide Interdisciplinary Courses . . 318
Second Baccalaureate Degree 34, 53
Sigma Xi 39
Social Studies Certification 158
Sociology 307
Sordoni Art Gallery 14, 15
Spanish 191, 199
Speech 117
Sports and Conference Center 16
Stark Learning Center 15
Student Access to Files 56
Student Activities 40
Student Activities Director 40
Student Activities Fee 26
Student Advisement 41, 42
Student Center 16, 52
Student Government 39
Student Life 37
Student Load 26, 55
Student Responsibility . . . 13, 26, 27, 59, 60
  Academic Standards Committee 58
  Access to Files 56
  Admissions 18
  Advisement 41, 42
  Athletics 8, 39
  Attendance 55
  Auditing 26, 55
  Bachelor of Arts 47, 51
  Bachelor of Business Administration 47, 51, 97
  Bachelor of Fine Arts 47, 51, 80
  Bachelor of Music 47, 51, 258
  Bachelor of Science 47, 51
  Calendar 46
  Career Services 33, 43
  Certification 51, 80, 158, 258
  Class Standing 32, 58
  Commencement 16, 46, 60
  Cooperative Education Program 52
  Counseling 42
  Cultural Activities 39, 40
  Employment 33, 43
  Evening Program . . 21, 22, 26, 33, 53, 54
  Expenses 26
  Extracurricular Activities . . . 8, 38, 39, 40
  General Education Requirements 48
  Grade Averages 57
  Graduate Study 11, 13, 54
  Graduation 60
  Honors 50, 58
  Incompletes 57
  Individualized Studies 226
  International Studies 227
  Loans 28, 33, 35
  Major 41, 47, 51, 53
  Meals 26, 38
  Minor 47, 52
  Orientation 27, 41
  Payments 28
  Probation 58
  Readmission 20
  Refunds 30, 31
  Registration 27, 41, 55
  Residence Halls 7, 16, 26, 38
  Scholarships 32, 35
  Social Activities 38
  Student Evaluation Files 56
  Student Center 16
  Summer Program 26, 46, 33, 53, 54
  Teacher Certification Requirements 51, 80, 158, 258
  Transfer Credit 20, 56, 58
  Transfer Students 20, 56, 58
  Tuition 26, 28
  Weekend Program 21, 26, 53, 54
  Withdrawals 56
Study Abroad 52
Summer Program 21, 26, 29, 46, 53, 54

(T)

Teacher Certification 51, 80, 158, 258
Testing Center 42
Theatre Arts 313
Transfer Credit 20, 56, 58
Transfer Students 20, 56, 58
Tuition 26
Tuition Discounts 30
Tuition Exchange Program 30
Tuition Payment Plans 28
Tuition Refund 30, 31
Tutorial Services 43, 44

(U)

Ukrainian 198
Undergraduate Degree Programs 46, 48, 49, 50, 66

Index

University-wide Interdisciplinary Core Courses 318
Upward Bound Program 44

(V)

Veterans Affairs (VA) 33
Veterinary Medicine 208

(W)

WCLH-FM 39
Weekend Program 21, 26, 33, 53, 54
Wilkes University
  Accreditation 14
  Admissions 18
  Background 7, 14
  Calendar 46
  Educational Program . . . 46, 48, 49, 50, 66
  Evening, Weekend, & Summer Program 21, 22, 26, 33, 53, 54
  Faculty Guide 328
  Graduate Studies 11, 13, 54
  Installment Payment Plan 28
  Mission 9
  Scholarships 32, 72
  Tuition Discounts 30
Wilkes/Hahnemann University Physical Therapy 214
Wilkes/Hahnemann University School of Medicine/Robert Packer Medical Center 205
Wilkes/King's Cross-Registration 55
Wilkes/Pennsylvania College of Optometry Program 208, 209
Wilkes/Pennsylvania College of Podiatric Medicine Program 208, 209
Wilkes/Pennsylvania College of Osteopathic Medicine Undergraduate/ Medical School Program 201, 206
Wilkes/Temple University College of Allied Health Professions Program . . . 211
Wilkes/Temple University Dentistry Program 208, 209
Wilkes/Temple University Pharmacy Program 219
Wilkes/Temple University Physical Therapy 217
Withdrawals 56
Women's Studies 317
Work-Study Program 33
Writing Center 44
Writing Intensive Courses 48

NOTES

NOTES

NOTES

Location of Frequently-Used Student Services

Act 101 Office . . . . . D
Admissions Office . . . . . B
Air Force ROTC L
Alumni Office . . . . . A
Athletic Department I
Bookstore C
Career Center . . . . . J
Continuing Education Office . . . . . J
Cooperative Education Office . . . . . J
Counseling Offices . . . . . G
Evening Program Office . . . . . D
Finance Office . . . . . N
Financial Aid Office . . . . . N
Graduate Admissions Office . . . . . B
Graduate Affairs Office . . . . . B
Health Sciences . . . . . M
Health Services . . . . . G
Library . . . . . F
Part-time Studies Office . . . . . D
University Relations Office . . . . . P
Recorder . . . . . N
Registrar . . . . . N
Residence Life Office . . . . . K
Student Affairs Office . . . . . D
Student Union Building . . . . . D
Study Abroad Coordinator . . . . . H
Summer Program Office . . . . . D
Testing Center . . . . . G
Theater . . . . . E
Upward Bound Office . . . . . O
Weekend Program Office . . . . . D
Wilkes University Learning Center . . . . . D
Writing Laboratory . . . . . H

Building Key

Symbol	Building and Location
A	Annette Evans Faculty and Alumni House, 146 South River Street
B	Chase Hall, 184 South River Street
C	Church Hall, 187 South Franklin Street
D	Conyngham Student Center, 130 South River Street
E	Dorothy Dickson Darte Center for the Performing Arts, Corner of River and South Streets
F	Eugene Shedden Farley Library, Corner of Franklin and South Streets
G	Evans Hall, Corner of South River and Northampton Streets
H	Kirby Hall, Corner of River and South Streets
I	Marts Center, 272-274 South Franklin Street
J	Max Roth Center, 215 South Franklin Street
K	Pickering Hall, Wright Street
L	Slocum Hall, 262-264 South River Street
M	Stark Learning Center, 160 South River Street
N	Student Services Building, 267 South Franklin Street
O	Sturdevant Hall, 129 South Franklin Street
P	Weckesser Hall, 170 South Franklin Street

1994-95 WEEKEND COLLEGE CALENDAR

(Courses taught on the campus of Keystone Junior College, La Plume, Pennsylvania)

Summer Session
May-August, 1994

May 13, 14, 15
June 3, 4, 5
*June 17, 18, 19
July 8, 9, 10
*July 22, 23, 24
August 12, 13, 14
(Including Final Examinations)

Fall Session
September-December, 1994

September 9, 10, 11
September 30, October 1, 2
*October 14, 15, 16
November 4, 5, 6
*November 18, 19, 20
December 9, 10, 11
(Including Final Examinations)

Spring Session
January-April, 1995

January 13, 14, 15
February 3, 4, 5
*February 17, 18, 19
March 10, 11, 12
March 31, April 1, 2
April 21, 22, 23
(Including Final Examinations)

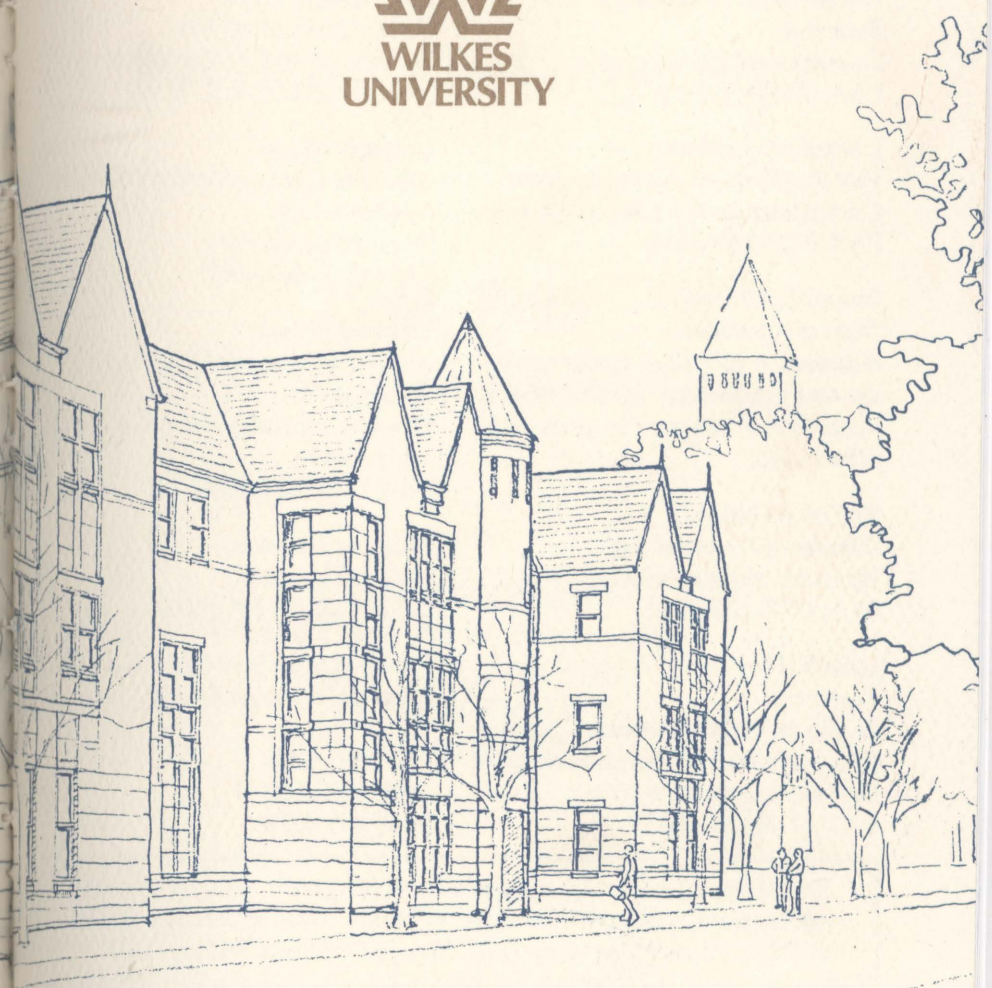
*Denotes 2 week interval.

WILKES UNIVERSITY
1994-95 ACADEMIC CALENDAR

Summer 1994 – Pre-Session		
Classes Commence	Monday, May 23, 1994	8:00 a.m.
Classes End	Saturday, June 11, 1994	12:00 noon
	(Including Final Examinations)	
First Day Session		
Classes Commence	Monday, June 13, 1994	8:00 a.m.
Classes End	Friday, July 15, 1994	12:00 noon
	(Including Final Examinations)	
Nine-Week Evening Session		
Classes Commence	Monday, June 13, 1994	6:00 p.m.
Classes End	Friday, August 12, 1994	10:00 p.m.
	(Including Final Examinations)	
Second Day Session		
Classes Commence	Monday, July 18, 1994	8:00 a.m.
Classes End	Friday, August 19, 1994	12:00 noon
	(Including Final Examinations)	
Fall Semester – 1994		
Classes Commence	Monday, August 29, 1994	8:00 a.m.
Opening Convocation and **Commencement**	Thursday, September 1, 1994	11:15 a.m.
Labor Day Recess	Friday, September 2, 1994	5:00 p.m.
Classes Resume	Tuesday, September 6, 1994	8:00 a.m.
Fall Recess	Thursday, October 20, 1994	10:00 p.m.
Classes Resume	Monday, October 24, 1994	8:00 a.m.
Thanksgiving Recess	Tuesday, November 22, 1994	10:00 p.m.
Classes Resume	Monday, November 28, 1994	8:00 a.m.
Special Note	Tuesday, December 6, 1994	
	(Follow Friday Class Schedule)	
Classes End	Friday, December 9, 1994	5:00 p.m.
Final Examinations Begin	Monday, December 12, 1994	8:30 a.m.
Final Examinations End	Tuesday, December 20, 1994	4:30 p.m.
Intersession 1995	Monday, January 2, 1995 to Friday, January 20, 1995	
Spring Semester – 1995		
Classes Commence	Monday, January 23, 1995	8:00 a.m.
Winter **Commencement**	Thursday, January 26, 1995	11:15 a.m.
Spring Recess	Friday, March 10, 1995	5:00 p.m.
Classes Resume	Monday, March 20, 1995	8:00 a.m.
Easter Recess	Wednesday, April 12, 1995	10:00 p.m.
Classes Resume	Tuesday, April 18, 1995	8:00 a.m.
Special Note	Tuesday, May 9, 1995	
	(Follow Thursday Class Schedule)	
Classes End	Wednesday, May 10, 1995	5:00 p.m.
	(Follow Friday Class Schedule)	
Final Examinations Begin	Friday, May 12, 1995	8:30 a.m.
Final Examinations End	Saturday, May 20, 1995	4:30 p.m.
Commencement	Saturday, May 27, 1995	2:00 p.m.



WILKES
UNIVERSITY



1994
GRADUATE BULLETIN
1995

WILKES UNIVERSITY • WILKES-BARRE, PENNSYLVANIA

CORRESPONDENCE DIRECTORY

Write or contact these persons for information on particular matters:

Christopher N. Breiseth
President
General institutional policy
FAX: (717) 824-2934

J. Michael Lennon
Vice President for Academic Affairs
Curriculum and academic affairs
FAX: (717) 824-2934

Emory Guffrovich
Dean of Admissions
Admission to Wilkes undergraduate and graduate programs and visits to the campus for tours and interviews

Rachel Lohman
Director of Financial Aid
Financial aid and scholarships
FAX: (717) 831-4902

John F. Meyers
Registrar
Readmission, registration, graduation audit and academic records of current or former students
FAX: (717) 831-4902

Jane Lampe-Groh
Dean of Student Affairs
Student affairs, readmission
FAX: (717) 831-4907

Leigh E. Major
Associate Dean of Student Affairs for Residential Life
Residential matters
FAX: (717) 831-4907

Edward Wood
Assistant Director of Financial Management
Student accounts and other information
FAX: (717) 831-4902

Mailing address:
Wilkes University
Wilkes-Barre, PA 18766

Office Hours: 8:30 to 4:30
Monday through Friday

(717) 831-5000
(800) WILKES-U
(800) 945-5378

For information on any of the graduate programs, programming or admissions, contact: **Dr. Wagiha A. Taylor**, *Dean of Graduate Studies* at (717) 831-4415, or write the Office of Graduate Studies.

Statement of Disclaimer
The statements in this bulletin are for purposes of information. The University reserves the right to change any provisions or requirements, including tuition and fees at any time within the student's term of residence. No contract is created or implied. Students must fulfill all prevailing degree or program requirements.

The cover is an architect's sketch of the new classroom/office complex under construction on South Franklin Street. This building, designed by the Hillier Group of Princeton, New Jersey, is the beginning of a $25,000,000 campus improvement project at Wilkes University.

Wilkes University

1994-1995
Graduate Bulletin

WILKES UNIVERSITY
Wilkes-Barre, Pennsylvania 18766
Telephone (717) 831-5000
1-800-WILKES U
(1-800-945-5378)

Statement of Nondiscrimination

Wilkes University does not discriminate on the grounds of race, color, national origin, sex, age or disability in the administration of or admission to any of its educational programs, activities, or with respect to employment, in compliance with Title VI, Title VII, Title IX, Section 504, ADA, and the Age Discrimination Act. It is the policy of Wilkes University that no person, on the basis of race, color, religion, national origin or affectional preference, or Vietnam-era veteran status, shall be discriminated against in employment, educational programs and activities, or admissions. Inquiries may be directed to the Dean of Student Affairs or the Affirmative Action Officer (Ext. 4500).

The University complies with the Ethnic Intimidation Act of 1982 of the Commonwealth of Pennsylvania which provides additional penalties for the commission of illegal acts of intimidation when such actions are motivated by hatred of the victim's race, color, religious or national origin.

Table of Contents

Wilkes at a Glance 4

General Information 8
- **Admission** 9
- **Academic Degree Requirements** 11
- **Financial Information** 16
- **Financial Aid** 17

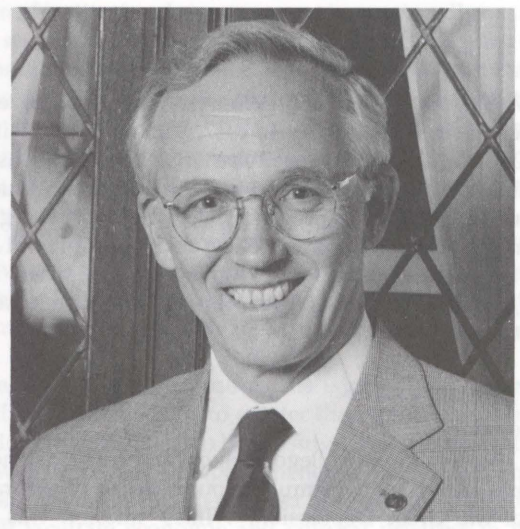
GRADUATION 19

School of Business, Society and Public Policy 20
- **Master of Business Administration (MBA)** 20
  - Concentrations:
    - Accounting 23
    - Finance 24
    - Health Care 24
    - Human Resource Management 24
    - International Business 25
    - Management 26
    - Management Information Systems 26
    - Marketing 27
    - Special Courses 28
- **Master of Health Administration (MHA)** 29

School of Liberal Arts and Human Sciences 35
- **Education — Master of Science in Education** 35
- **English — Master of Science in Education** 45
- **History — Master of Science in Education** 47
- **Nursing — Master of Science with a Major in Nursing** 50

School of Science and Engineering 54
- **Biology — Master of Science in Education** 56
- **Chemistry — Master of Science in Education** 60
- **Engineering — Master of Science in Electrical Engineering** 62
- **Engineering — Doctor of Philosophy (Ph.D.) in Electrical Engineering** 63
- **Mathematics — Master of Science** 70
- **Mathematics — Master of Science in Education** 70
- **Physics — Master of Science in Physics** 77
- **Physics — Doctor of Philosophy (Ph.D.) in Physics** 78
- **Physics — Master of Science in Education** 81
- **Earth and Environmental Sciences** 82

Graduate Program Administration 83



The President's Message

Graduate education at Wilkes University is designed to meet the educational needs both of students continuing their studies immediately following their undergraduate work and of established professionals who seek to enhance their credentials. You will find that the close faculty-student contact for which Wilkes is known in its undergraduate program also characterizes its graduate instruction.

A significant part of our mission as a comprehensive institution of higher education is to help adults pursue their educational goals, while at the same time strengthening the breadth and sophistication of the labor force in Northeast Pennsylvania. It is for these reasons that new graduate degrees in Pharmacy and Education were recently approved by the Board of Trustees. Wilkes University is committed to offer a graduate education that challenges and enriches students' lives, intellectually, culturally and socially.

Christopher N. Breiseth
President

Wilkes At A Glance

Wilkes University was founded in 1933 when Bucknell University established a branch junior college in Wilkes-Barre. In 1947, Bucknell University Junior College became Wilkes College, a four-year, coeducational, liberal arts institution. In 1959, graduate programs were added to the curriculum. With continued expansion, in both graduate and undergraduate programs, the University reorganized itself into a School of Business, Society and Public Policy, a School of Liberal Arts and Human Sciences and a School of Science and Engineering. This new structure serves approximately 1,800 full-time and 600 part-time undergraduate students and over 1,000 graduate students.

The Wilkes Tradition

Community Service

Founded in 1933 as a junior college, Wilkes came into existence in the midst of the economic crisis caused by the simultaneous collapse of anthracite coal mining and the onset of the Great Depression. Wilkes' mission was to make higher education accessible to ambitious but underprivileged youth and to produce new leadership for an area in dire need of renewal and hope for the future. After World War II, Wilkes responded again to a community need, transforming itself into a four-year college to aid in the massive task of preparing returning veterans for challenging and rewarding careers. More recently, Wilkes has developed into a comprehensive institution, offering a broad range of bachelor's and master's degree programs, continuing the College's tradition of service to the community through educational programs of high quality and direct relevance to the area's economic and cultural development. On January 1, 1990, Wilkes College officially became Wilkes University.

Academic Excellence With Human Understanding

Wilkes' mission has been shaped in fundamental ways by the unique perspective on education of Eugene Shedden Farley, Wilkes president for more than thirty-five years, who possessed a distinctive vision of higher education — a vision articulated in his collected works, *Essays of an Educator*. Farley advocated a rigorous academic program which would require students to meet high standards and enable them to compete successfully in leading graduate and professional schools. Moreover, Dr. Farley's Quaker background led him to place equally strong emphasis on education's role in cultivating individual integrity, personal responsibility, and sensitivity to the beliefs and customs of persons from diverse cultural backgrounds. Wilkes' tradition of recruiting an ethnically and religiously diverse faculty and student body and ensuring that campus clubs and associations welcome all students as members can be traced to Dr. Farley's guidance of the College in its formative years. The only independent, non-denominational, four-year university in the region, Wilkes has fulfilled a special role in building a close-knit campus community composed of persons from a wide variety of traditions and points of view. As a result, academic excellence in a context of tolerance and diversity has come to be a strong component of the Wilkes tradition.

Purpose: Education and Service for a Dynamic Future

While a cherished tradition may provide inspiration and suggest broad guidelines, the question of institutional purpose must be continually examined in light of developments in society and technology. Specifically, Wilkes must strive to identify purposes and conduct programs which will be of value to its students and the community in the social and technological environment of the future.

Society will continue to be in a state of constant, transforming change in response to new information, technological advances, and unanticipated developments. A society characterized by extensive change demands education which prepares individuals and communities to be flexible and adaptive, ready to benefit from innovation. In particular, those in leadership positions must be educated to manage successive waves of change and to channel those changes productively. Wilkes' overarching imperative must be to educate its students and help the surrounding community to flourish in a setting of technological and societal dynamism.

Wilkes defines its major purpose as the education of men and women to develop essential intellectual skills, to master the core concepts and principles of their chosen fields and disciplines, to be sensitive to aesthetic concerns and ethical issues, and to be well prepared to adapt to change in their careers and in community life. The University is committed to conduct applied research and outreach programs which will facilitate economic and cultural progress in the region while enriching the educational experiences of students and faculty members. By excelling in these approaches to teaching, research, and service, Wilkes aims to contribute to the supply of human resources and applied knowledge needed for a more prosperous, cultured, and humane society.

Graduate Programs

In the last decade, Wilkes has increased substantially its engagement in graduate programs at the master's degree level in the arts and sciences as well as professional fields. Emphasis has been placed on programs that are responsive to student needs for career advancement and the institution's role in applied research and outreach to the region. The graduate program, viewed as a whole, has the following defining and distinctive goals:

1. A focus on programs designed for persons who are seeking personal growth, career advancement, and professional development.
2. Concentration on graduate degree programs intended to advance the economic and cultural development of the region.
3. Engagement in outreach programs which link external organizations with campus academic life and provide opportunities for applied research to graduate students and faculty members.
4. A multi-disciplinary approach to graduate studies, emphasizing breadth and adaptability to changing professional and societal conditions.

5. The development of carefully structured cooperative agreements, which provide for the offering of other institutions' programs on the Wilkes campus and the offering of Wilkes' programs on other campuses in the region.

6. Concentration on graduate programs in fields which are already strong in terms of faculty, facilities, and library resources at the undergraduate level and which will be augmented by graduate level offerings.

Wilkes envisions an expanding role in graduate education; however, the primary focus of the institution will remain on excellence in undergraduate studies.

In Conclusion

The faculty, administration, and Board of Trustees continually assess the purposes and goals of Wilkes University and the programs designed to attain them. The unchanging principle guiding the University is to provide educational opportunities and outreach services which are responsive to student and community needs and consistent with Wilkes' tradition of service, excellence, and diversity.

Buildings and Facilities

The **E. S. Farley Library**, named for the first president of Wilkes, exists to provide its users with effective access to recorded information. The Library has acquired a substantial collection of carefully selected materials in a variety of formats and media, including over 200,000 volumes, 1,100 current journal and newspaper subscriptions, and over 600,000 microforms. Particular subject strengths include English literature, American cultural history, and the history of science. The Farley Library's automated catalog system enables users to search the various collections at Wilkes (books, journals, and audiovisual materials) by author, title, subject, and key words on public access terminals. Online database searching is available to students and faculty through the Reference Department of the Library. Special facilities include a microcomputer lab, special collections rooms, audio/visual resources and microform equipment. Library collections are supplemented by cooperative arrangements with other libraries. Through a variety of printed and online sources, the Library is able to identify and locate virtually any published materials needed by library users.

The **Dorothy Dickson Darte Center for the Performing Arts**, dedicated in 1965 and the gift of Dorothy Dickson Darte, features a fully-equipped, 500-seat theater on a site deeded to Wilkes by the Wyoming Valley Society of Arts and Sciences. It contains a scene shop, dressing rooms, rehearsal areas, costume rooms, hydraulic lift forestage, patch panel with 246 circuits, and a 10-scene preset with 60 dimmers. The facility is well-equipped for instructional use and regularly used for University and community presentations.

The **Dorothy Dickson Darte Music Building** opened in the summer of 1969 as the second phase of the Center for the Performing Arts. It houses faculty offices, studios, classrooms, practice and rehearsal rooms, and it is the centerpiece for

Wilkes' highly regarded music programs. Concerts and recitals are regularly presented in Gies Recital Hall and are open to the public.

The **Sordoni Art Gallery**, given to Wilkes in 1973 by The Andrew J. Sordoni Foundation, Inc., is located in Stark Learning Center. The main purpose of this modern facility is to present art exhibitions to enrich the lives of the Wilkes community and the region. Exhibitions are supplemented by lectures, tours, demonstrations, and related arts programs. A growing permanent collection embraces all media but is particularly strong in nineteenth and twentieth century American and European paintings and a print collection which includes old masters as well as contemporary artists. The Gallery is a particularly valuable study facility for students.

Stark Learning Center, named in honor of the late Admiral Harold R. Stark who was an Honorary Chairman of the Wilkes Board of Trustees, opened in 1958 and was expanded in 1973. Stark Learning Center is the major instructional facility on campus, and it provides approximately 85,000 square feet of modern classroom, laboratory, studio and office space. It houses the Departments of Biology, Chemistry, Electrical and Computer Engineering, GeoEnvironmental Sciences and Engineering, Mathematics and Computer Science, Mechanical and Materials Engineering, Physics, and Psychology as well as the University's Computer Support Center.

Academic Computing Facilities include a campus-wide computer network which connects the main academic IBM RS/6000 minicomputer and subnet servers located in the Electrical and Computer Engineering Department, the GeoEnvironmental Sciences and Engineering Department, the Mathematics and Computer Science Department, and the Mechanical and Materials Engineering Department as well as the University's connection to the Internet. Microcomputer facilities include: the Computer-Aided Design Laboratory; the Regional Computer Resource Center Macintosh Laboratory; the Computer/Simulation Laboratory; the Math/Computer Science Department's IBM PC Laboratory; the School of Business, Society and Public Policy's MS-DOS Laboratory; the English Department's Writing Center and Writing Center Computer Classroom; the Communications Department's MS-DOS Writing Laboratory; and the Art Department's Graphics Laboratory.

The **Arnaud C. Marts Sports and Conference Center** and **Outdoor Recreational Plant** provide space for organized intramural and intercollegiate athletic events as well as wellness and leisure-time activities for individual students. The new multi-purpose center provides for academic conferences, lectures, and seminars as well. In addition to playing fields for baseball, softball, field hockey, soccer, and football, the University has a weight room and asphalt tennis court. Wilkes actively promotes use of all its facilities by all constituencies of the University.

General Information 1994-1995

Wilkes University is an equal opportunity and affirmative action institution. No applicant shall be denied admission to Wilkes because of race, color, sex, religion, national or ethnic origin, or handicap. See inside front cover for further information.

Wilkes reserves the right to change the requirements and regulations contained in this bulletin and to determine whether a student has met its requirements for admission or graduation, and to reject any applicant for admission for any reason the University determines to be material to the applicant's qualifications to pursue graduate education.

Graduate Programs

Graduate programs were established in 1959 when the Board of Trustees authorized graduate study in the departments of chemistry and physics. The first master's degrees were conferred in 1965.

Graduate programs are designed to provide the opportunity for completion of a master's degree in one or two years of full-time study. Cycling of graduate courses allows a full-time student to plan for continuous progress in the program.

The programs also allow businesspersons, engineers, scientists, teachers, and others employed in the region to continue their studies without interrupting their employment. To permit a combination of work and study, many classes are scheduled to meet during late afternoon and early evening hours.

Academic responsibility for each graduate degree program is vested in the dean of the component school of Wilkes University which includes the department offering the degree program. Graduate program admissions criteria are the responsibility of the Graduate Studies Committee, while applications for admission are processed by the Admissions Office. Extra-curricular and other support services for graduate students are provided by the Office of Graduate Studies.

Graduate Degree Programs

Degrees	Programs
Master of Business Administration M.B.A.	Business Administration Concentrations Available: Accounting, Finance, Health Care, Human Resource Management, International Business, Management, Management Information Systems, Marketing
Master of Health Administration, M.H.A	Health Care Administration
Master of Science, M.S.	Mathematics, Nursing and Physics
Master of Science in Education M.S.Ed.	Secondary Education/Biology Secondary Education/Chemistry Secondary Education/English Secondary Education/History Secondary Education/Mathematics Secondary Education/Physics Options: Educational Computing Educational Development and Strategies
Master of Science in Electrical Engineering M.S. EE.	Electrical Engineering

Accreditation

Wilkes' graduate programs are approved by the Department of Education of the Commonwealth of Pennsylvania and accredited by the Middle States Association of Colleges and Secondary Schools.

In addition to the total program accreditation, certain special areas are recognized by professional societies.

Wilkes University is a member of the Council of Graduate Schools in the United States, the Pennsylvania Association of Graduate Schools (PAGS), and the Northeast Association of Graduate Schools (NAGS).

Admissions

Application

Those interested in graduate programs offered at Wilkes should apply to the Admissions Office in Chase Hall. They should contact that office to obtain the forms and information needed to proceed with their application. They must fill out the "Application for Graduate Admission" form and arrange for the submission of official transcripts of all previous college and/or university work. All Schools also require letters of recommendation and some require test scores for admission. The MBA program requires scores from the Graduate Management Admission Test (GMAT); the Engineering program requires scores from the Graduate Record Exam and Nursing requires scores from the MAT or GRE. For information on testing contact the Educational Testing Service, Box 955, Princeton, NJ 08540.

Students, other than international students, who are unable to complete the application process prior to the beginning of their first semester will be allowed special admission to the program pending processing of their applications. This policy does not imply acceptance of the special student into the degree program. Students failing to complete the application process by the beginning of the second semester after their initial application may be denied the right to register for courses.

To All Applicants:

An incomplete application (i.e. not processed, no academic advisor, no approved program) will be held for no more than two years. After this period of time it will be invalid and the applicant will need to file a new application.

Qualifications

For admission to graduate study an applicant must have received, from an accredited institution, a baccalaureate degree earned under residence and credit conditions substantially equivalent to those required by Wilkes. Ordinarily, an entering student must have completed in a satisfactory manner a minimum of course work in designated areas, the specific courses and amount of work depending upon the field of advanced study.

Although no minimum undergraduate grade point average is a requirement for admission, it is expected that candidates for admission shall have maintained good or above-average performance during their undergraduate years and shall exhibit evidence of intellectual and temperamental fitness for graduate study.

Specific departmental requirements established for each area of study are to be found herein. Each applicant should consult these requirements prior to filing an application. A student whose background is judged to be deficient in any specific area

of the proposed field of study or whose undergraduate grades are below standard may be asked to remedy the deficiency by taking one or more courses at the undergraduate level, without graduate credit.

Classification of Students

A graduate student may be admitted either as a degree or a special non-degree student, depending upon the student's objectives. After admission to one of these categories, any change of status must be sought via the academic department to which the student has been assigned.

Degree Candidates

Provisional admission is a temporary classification in which a student may remain until completion of 12 graduate credits and all outstanding undergraduate prerequisites. A provisionally admitted student who wishes to petition for regular admission must submit a written request to the Dean of Graduate Studies. **An applicant accepted provisionally will be permitted to take a maximum of 12 graduate credits as a provisionally admitted student.** Under extraordinary circumstances, a student may petition to the Graduate Dean for an extension.

Regular admission is granted to students who have demonstrated an acceptable level of academic work in their undergraduate program and are prepared for work at the graduate level in their field of specialization.

Note: nine credits per semester is considered to be full-time for graduate students.

Wilkes undergraduate students may be permitted to enroll in certain graduate courses with the approval of their advisors, the Department Chairperson, the Dean of the school offering the course, and the Dean of Graduate Studies. Credit for such courses will be at the undergraduate level.

Special Non-Degree

Students are allowed to register as special non-degree students. They must complete the Application for Admission form, check status desired (special non-degree) and pay the application fee. Special non-degree applicants are allowed to accumulate up to six credits only. Upon the completion of the six credits, they must declare their intention to change their status to degree candidate status or their right to register for courses may be revoked. Exceptions to this policy must be approved by the Dean of the School in which the student seeks to take additional courses as a special non-degree student.

Auditing

A person desiring to audit a course does not need to meet normal admission requirements, but must obtain approval to audit from the course professor, and indicate "audit" on the registration form. Auditors must file the regular Application for Admission. The student receives no credit for courses taken as an auditor and does not complete examinations or turn in written work.

Changing to Auditor Status

A student enrolled in a course may apply to become an auditor by completing a change-in-class-status form, available at the Registrar's Office, and must obtain necessary approval from the advisor and course professor. This change of status must be completed before the end of the second week of the class.

International Students

International students, holding an F-1 visa, should plan to apply at least three months prior to the beginning of the semester or summer session in which they intend to begin graduate studies. They must submit two certified English translations of all academic records.

All applicants whose native language is not English and who hail from non-English speaking countries must take the TOEFL (Test of English as a Foreign Language) and submit the results of this test with the application for admission. A student must present a minimum TOEFL score of 550 to be considered for admission.

It is required that each international student submit an affidavit of support indicating that the applicant is able to cover one full year of tuition plus living expenses in the United States.

The Immigration and Naturalization Service of the United States Department of Justice requires a certificate of eligibility (Form I-20A) to be initiated by the University and completed by the student prior to applying for a student visa to study in this country. Any extension of stay or employment while in the United States must have the prior approval of the regional office of the Immigration and Naturalization Service.

International students must maintain full-time status.

International students may be required to take certain courses for undergraduate credit which are not applicable to the master's degree. In some cases these courses will be specified in the admissions letter, but the Dean of a School, in consultation with the department chair and the student's advisor, may make additional requirements if a student is found to be deficient in the English language or in background knowledge in the field.

All international students should register their names with the International Student Advisor as soon as they arrive. The International Student Advisor, second floor, Conyngham Center, serves as advisor on non-academic matters to all international students. Services provided include counseling on housing, visa problems and other difficulties in adjusting to life in the United States.

Academic Degree Requirements

Students may be awarded the master's degree upon satisfaction of all graduate degree requirements and the following specific requirements:

1. **Regular** admission to the graduate program;
2. Satisfactory completion of all requirements for the degree to be completed within six calendar years preceding the date of the granting of the degree. If an extension of the six-year limit is needed, a request should be submitted in writing to the Graduate Dean. The Graduate Dean will review and consult with appropriate parties (graduate program director, chair, advisor or academic dean). The Dean of Graduate Studies will notify the student and the appropriate administrative offices of the final decision. If a student wishes to appeal the decision he/she submits a petition to the Graduate Studies Committee.
3. A minimum average of 3.0 for all graduate work (see Retention Policy);
4. Completion of specific School requirements;
5. If a thesis is required, the candidate should:
   a. Be accepted by a thesis advisor and an Advisory Committee, before completion of nine hours of graduate study;
   b. Submit an acceptable thesis in the required format and quantity of copies

not later than 3 weeks prior to the commencement at which the degree is to be conferred;

c. Complete arrangements for publication of the thesis.

Specific requirements for graduate degrees will be found within each School.

Students CANNOT substitute other courses for any of the core courses in any program.

Retention

A graduate student who accumulates two grades below 3.0 in one or more graduate courses will be placed on probation. A student earning a third grade below 3.0 will be dismissed from the graduate program. A student who is dismissed from the graduate program may request a review of the case by the Faculty Committee on Graduate Studies. The request should be submitted in written form to the Dean of Graduate Studies.

Specific graduation requirements are listed under each specific program section.

Transfer Credits

A maximum of 6 credits of graduate work done at another accredited and recognized institution may be applied toward the requirements for the master's degree. There is no exception to this policy.

Approval to apply any transferred credits toward a degree program must be granted by the Chairperson of the Department or, in the case of the MBA, the Program Director. Transferred academic work must have been completed within **six years** prior to the date of admission to the graduate program at Wilkes, with a grade of B or better. Pass-Fail grades are not transferable to a degree program unless the "Pass" can be substantiated by the former institution as being a grade of B or better. **Grades earned in transferred courses are not included in the computation of the cumulative grade point average at the University.**

Wilkes graduate students who seek to take a graduate course at another institution and to transfer the credits back to the University must complete a "Prior Approval Form." All completed forms for transfer of credits should be submitted to the Registrar's Office where forms for transfer of credit may be obtained.

Grade Regulations

Numerical grades are given for graduate work:

4.0 = A	Academic achievement of superior quality
3.5 = B+	Academic achievement of good quality
3.0 = B	Academic achievement of acceptable quality in meeting requirements for graduation
2.5 = C+	Academic achievement of adequate quality but below the average required for graduation
2.0 = C	Academic achievement below the average required for graduation
0.0 = F	Failure. No graduate course credit

A grade of "X" indicates assigned work yet to be completed in a given course. Except in thesis work, grades of "X" will be given only in exceptional circumstances. Grades of "X" must be removed through satisfactory completion of all course work no later than four weeks after the end of the final examination period. Failure to

complete required work within this time period will result in the conversion of the grade to 0. **An extension of the time allowed for the completion of work should be endorsed by the instructor in the form of a written statement and submitted to the Registrar.**

One-Credit Courses

To achieve more flexibility and to promote advancement of knowledge, the Graduate Division has provided the opportunity for students to take a series of one-credit courses. Such courses must meet department/school requirements.

Regulations for Withdrawal

A student may withdraw from a course during the first three weeks of the semester by informing the instructor, completing a withdrawal form which is co-signed by the student and the student's advisor, and returning the signed form to the Registrar's Office within the first three weeks of the semester. A student may withdraw from a course from the end of the third week through the eighth week only with the approval of both the instructor and the student's advisor. (The completed form must be returned to the Registrar's Office by the end of the eighth week.) Thereafter, a student may withdraw from a course only for serious circumstances, as determined by the Department Chairperson or the Director/Coordinator of the appropriate graduate program in consultation with the instructor and the Dean of Graduate Studies. A grade of "W" indicates an authorized withdrawal from the course.

It is the student's responsibility to initiate withdrawal from a course by obtaining the withdrawal form from the Registrar's Office, having it signed by the appropriate personnel, and returning it to the Registrar within the three- or eight-week period. A grade of "O" is assigned by the instructor and recorded for all courses in which no official withdrawal, as specified above, has been completed by the student.

"W" is not a grade; it does not constitute a reflection of academic performance within a course. The appropriate grade for academic performance below the minimum standard for course credit is "0."

A "W" granted during the first three weeks reflects a decision on the part of the student, after consultation with the instructor and advisor, not to be enrolled in a course. In those cases in which a student withdraws from one course to add another during the first week of class of the semester, a "W" will not appear on the transcript. A "W" granted during the remainder of the course constitutes recognition and agreement by the student, instructor, and the advisor, that, due to some extraordinary circumstances beyond the student's control, enrollment in that course is not possible or feasible. Fear of receiving a low grade does not constitute an extraordinary circumstance.

Appeal of Grade Policy

Students who have a clear and justifiable grievance with reference to a grade should first seek resolution with the instructor and, subsequently, with the department chairperson/director. It is expected that they will consult with the faculty member in an effort to resolve the dispute. The chairperson may also exercise the option to involve the appropriate dean in the discussions with the faculty member.

If satisfaction cannot be obtained, the student has the right to appeal to the Vice President for Academic Affairs. The appeal must be made by the end of the fourth week of the subsequent fall or spring semester. The Vice President will consult with

the appropriate dean and department chairperson and will establish an appeal committee of three faculty members — at least two of whom shall be from the department of the faculty member involved, if this is possible. A committee chairperson will be appointed by the Vice President for Academic Affairs. The committee chairperson will notify the faculty member of the appeal and the composition of the committee.

The appeal committee will hear the student's complaint, interview the faculty member, and study the evidence presented by both parties. If necessary, the committee may interview other students or faculty in its efforts to determine the facts.

The committee will make a report to the Vice President for Academic Affairs in which it reviews the issues and recommends a solution. In most cases this will be a recommendation to uphold the grade awarded by the instructor or to alter the grade which the student received. In some cases the recommendation may be to present the student with other alternatives such as the completion of additional work before a final grade is determined.

The Vice President for Academic Affairs, after consultation with the President, will inform the faculty member and the student of the recommendations of the appeal committee and will take the steps which are necessary to implement the recommendation.

Change of Degree Program, Major or Concentration

When changing program, major or concentration, students must submit a petition to their academic advisor stating the reason for such a change.

Regulations on Thesis Research

Each graduate student shall select a major advisor under whose direction he/she wishes to pursue thesis research, if a thesis is required. Following acceptance of the candidate, the advisor shall appoint two other members of the graduate faculty to serve with the advisor as the student's Advisory Committee.

Part-time students employed in laboratories on a full-time basis may be permitted to conduct their thesis research in these laboratories, if a mutually satisfactory agreement can be reached by the student, the laboratory staff, and the University. In such cases, a qualified member of the staff of the employer shall be named by the Dean of the School to serve as a member of the student's Advisory Committee. This staff person shall also be appointed an adjunct professor of the University and shall supervise the day-to-day progress of the student's research.

Thesis Policy

1. Upon approval of the thesis topic, the student and the advisor shall meet to identify the objectives, to develop a timetable, and to plan the distribution of credits across that timetable. This written plan is to be made part of the student's files in the department office and the Registrar's Office.
2. The student shall be continuously registered for a minimum of one thesis credit up to and including the semester that he/she defends the thesis and submits the final copies of the thesis.
3. The thesis objectives should be completed within the allocated number of credits and within the timetable developed; however, circumstances and the uncertainties associated with research and project work may require subsequent adjustments to the credits allocated and the timetable. Such adjustments shall also become part of the student's files in the department office and the Registrar's Office.

4. Students registered for thesis credits will be awarded a grade reflecting the level and the quality of work conducted for that semester. Incomplete and audit designations are explicitly excluded as thesis grades.
5. The satisfactory completion of the thesis is indicated by passing the oral examination and obtaining the necessary approvals from the Thesis Committee, the Department Chair, the School Dean, and the Dean of Graduate Studies.
6. Student appeals to any provisions in this policy shall be to the Thesis Advisor, the Department, the School, and finally to the Graduate Studies Committee.

The original and two copies of the thesis must be submitted to the Dean of Graduate Studies after the thesis has been approved by the Advisory Committee. One copy will be filed in the Library, one in the Office of the Dean of the School and one in the appropriate department. If the student desires a personal copy bound, an additional copy should be furnished. For thesis binding fees, see under fees and expenses.

Examinations and Tests

Challenge Examinations: Students who desire to remove undergraduate deficiencies may do so by formal coursework or by challenge examination. Challenge examinations cannot be used to earn credits toward the graduate degree. Arrangements are made by the student directly with the Graduate Program Director . The fee for each challenge examination is $35 per credit.

Transcripts

Transcripts are provided by the Office of the Recorder. They are issued only upon written request by the student, and should be requested at least three weeks prior to the date needed. A student requesting a transcript in person must present valid identification.

Transcripts given directly or mailed to students do not carry the University seal and are not official. The seal is attached only when the transcript is mailed directly from the University to another academic institution or authorized agency.

There is no charge for the first transcript requested from Wilkes. The student will pay four dollars for each additional transcript.

A transcript of work completed at any college or university other than Wilkes University must be obtained directly from that institution.

The Family Educational Rights and Privacy Act of 1974

Wilkes University, in full compliance with the Family Educational Rights and Privacy Act of 1974, shall make educational records available to students upon request. Likewise, in accordance with the law, individually identifiable educational records will not be released to other than authorized individuals without written consent of the student.

Wilkes University has established a policy on access to and release of student information for compliance with provisions of this act. This policy is published in the Wilkes University **Student Handbook,** which is available in the Graduate Office or the Library.

Disciplinary Procedures

Graduate students are obligated to observe the regulations governing all Wilkes University students relative to:

1. Academic honesty and integrity;
2. Respect for the rights of others relative to their safety, welfare and educational commitments;
3. The safety and security of the entire community.

Any disciplinary cases arising from a lack of observance of these regulations will be adjudicated by the Graduate Dean and the Dean of Student Affairs. These two Deans shall have the responsibility of hearing such cases with the Chairperson of the Graduate Studies Committee and a student.

Any appeals from the decisions of this Committee may be made in written form to the Vice President for Academic Affairs.

Financial Information

Tuition and Fees

All payments for tuition, board, fees, etc., are due at the time registration forms are processed and no later than two weeks before the start of classes. Payment of all charges is to be made at the Financial Management Office, Student Services Building.

Several plans have been developed to assist students who do not have the cash in hand, and it is suggested that these plans be considered when special assistance is needed. Students may consult with the Director of Financial Aid for information regarding scholarships and loan programs.

Subject to the regulations concerning refunds, the total tuition is considered fully earned by the University upon completion of registration by the student.

Application Fee: $30
Tuition Cost per Semester: $390 per credit hour.
General Fee: $6 per credit hour.
Graduation Fee: $120 (Charged to all graduating students in their last semester.)*
Thesis Binding Fee: $15 per copy.
Transcript Fee: The first transcript is free of charge; the fee for the second and subsequent transcripts is $4 per copy.
Audit Fee: One half of tuition cost.
* Effective Summer 1994

Individual departments have the right to charge laboratory and breakage fees as appropriate.

Third-Party Billing and Deferred Payment forms may be picked up at the Financial Management Office. **These forms must be submitted each semester.**

Note: The Financial Management Office is prohibited from signing graduation clearance forms until any outstanding balance is paid in full. Graduates who have requested the deferred payment option must pay the final semester balances personally before clearance forms are signed (or have a written guarantee from their employer that the amount will be paid to Wilkes regardless of course completion or final grade). Those prospective graduates not complying with the above policy will not be cleared until actual cash payment is received from their employer.

Refunds

Students who have paid their tuition in full and who withdraw from courses or from the University during the time limits indicated below will receive tuition refunds, upon written request to the Assistant Director of Financial Management, according to the following formula. (Fees are non-refundable. Refunds for special sessions [sessions which do not correspond to the calendar outlined below] will be calculated by the Financial Management Office upon student request.)

Charges for students attending their first semester will be refunded pro-rata in accordance with the 1992 reauthorization of the Higher Education Act.

Academic Year	Time of withdrawal	Tuition refund
	First two weeks	80%
	Third and fourth week	60%
	Fifth week	40%
	After fifth week	No refund
5-week Summer Sessions	First week	50%
8-week Summer Sessions	First two weeks	50%
	After stated period	No refund
Weekend College	Through second weekend	50%
	After second weekend	No refund

Financial Aid

Assistantships and Counselorships

The University awards a limited number of Graduate Assistantships. **Applications for these assistantships must be filed with the Dean of Graduate Studies no later than March 1 for the following academic year.**

A number of counselorships in undergraduate residence halls are available each year to graduate students. Applications for these positions must be filed with the Director of Housing no later than February 1 to be considered for the academic year beginning in September.

Criteria for Selecting Graduate Assistants

1. Admission to the program and full-time status.
2. Full-time (nine credits per semester) status while holding the assistantship.
3. Minimum 3.0 undergraduate grade point average. Current graduate students may apply for an assistantship after completion of nine semester hours of graduate credit with a cumulative average of 3.0 or higher.
4. Two additional letters of recommendation and submission of personal resume (character reference, if needed).
5. Successful interview or equivalent assessment of suitability for assistantship.
6. Ability and willingness to perform the duties assigned by the Program Director in the MBA program or by the department chair and/or the supervisor.

Institutional and Financial Assistance Information

The following information concerning student financial assistance may be obtained from the Director of Financial Aid, Student Services Building, 267 S. Franklin Street:

1. Financial aid programs available to students who enroll at Wilkes;
2. The method by which such assistance is distributed;
3. The means, including forms, by which application for student financial assistance is made; the requirements for accurately preparing such applications; and the review standards employed to make awards for student financial assistance.

Alumni Discount

Wilkes encourages graduates of the University to continue their education. Therefore, alumni qualify for a 10% discount on tuition for undergraduate and graduate courses. A written request for this discount should be submitted to the Financial Aid Office at the time of registration.

Loans

There are several federal loan programs available to graduate students. While each has its unique characteristics, there are some standardized features which apply to all of the following loans. In order to qualify, a student must be accepted as a degree candidate, must be a U.S. citizen or permanent resident, must be enrolled on at least a half-time basis and must be in good academic standing according to the academic progress standard set for receipt of federal aid. To determine eligibility, all students must complete the Free Application for Federal Student Aid and must obtain a Financial Aid Transcript from each post-secondary institution attended. These forms are available at the Financial Aid Office.

Important Terms

Academic Grade Level: Graduate programs are divided into two grade levels; the first 15 graduate credits are grade level 6 and the remainder of the program is grade level 7.

Academic Progress: For continued participation in the loan programs, students must meet specific academic progress requirements which include the successful completion of a specific number of credits based on their enrollment status and the maintenance of a 3.0 cumulative grade point average.

Enrollment Status: Full-time is 9 graduate credits per semester; half-time is 6 graduate credits per semester.

Graduate Student: A student who has been officially accepted as a candidate in a graduate degree program.

Federal Stafford Loans

The subsidized Stafford Loan is a federal program that enables students to borrow money from a bank, credit union, savings and loan, or other participating lenders. It is available to graduate students who are enrolled on at least a half-time basis and who show financial need. The loan is interest-free while the borrower is enrolled

at least half-time and for the first six months following termination of such enrollment. Graduate students may apply for $8,500 per academic grade level.

Interest begins to accrue the seventh month after the student ceases to be enrolled on at least a half-time basis. If the borrower has a previous Stafford Loan, the interest rate remains the same as that of the first loan, provided there is an outstanding balance on the loan. Any student who borrowed for the first time after October 1, 1992, has a flexible interest rate.

Repayment of principal and interest begins six months after the student ceases to be enrolled on at least a half-time basis.

The unsubsidized Stafford Loan differs from the subsidized loan in that the student must pay the interest on the loan while enrolled. Under the federal subsidized Stafford Loan, the government pays interest on the loan while the student is enrolled in college. This loan is for students who do not qualify because of lack of financial need for any or all funds under the subsidized Stafford Loan program.

A borrower who is eligible for a portion of the subsidized Stafford Loan may borrow the difference from the unsubsidized Stafford Loan program. The maximum loan limit includes a combination of the subsidized and unsubsidized loan.

The borrower is expected to make quarterly interest payments while the student is enrolled in college. The loan carries a flexible interest rate.

Repayment of the principal begins six months after the student is no longer enrolled on at least a half-time basis.

Applications may be obtained from your local lending institution.

Additional Unsubsidized Stafford Loan

Graduate students are eligible to apply for additional unsubsidized Stafford Loan funds which are over and above the Stafford Loan maximums described above. This additional amount replaces the former SLS Loan. The maximum additional amount is $10,000 for academic grade level with an aggregate limit of $73,000.

This loan carries the same interest rare and repayment obligation as described under the section on Stafford Loans.

Graduation

All graduate students are expected to participate in one of the three commencement exercises held over the calendar year. These exercises occur in August, January and May each year.

It is the responsibility of the graduate student to notify the Registrar's Office of his/her intention to graduate. This written notification must be received in the Registrar's Office no later than ninety days prior to the date of the Commencement Exercise at which the student expects to be graduated. Graduate students must also register for graduation (GRD-000B) for "O" credit at the beginning of their final term before graduation.

School of Business, Society and Public Policy

Gary A. Giamartino, Ph.D., Dean
Wagiha A. Taylor, Ph.D., Dean of Graduate Studies
and Director of Graduate Business Programs
Richard G. Raspen, Ph.D., Chairperson of the Business and Economics Department
Cynthia J. Chisarick, M.B.A., C.P.A., Chairperson of the Accounting Department
Michael S. Garr, Ph.D., Chairperson of the Sociology and
Anthropology Department
Thomas J. Baldino, Ph.D. Chairperson of the Political Science Department
Thomas M. McCaffrey, J.D., Acting Director of the Health Services Administration
Program

Programs

Master of Business Administration (MBA)

Evening Program

The Evening MBA Program is a traditional evening program in which students attend a particular course on one non-weekend evening per week in the regular academic year and two non-weekend evenings per week during the Summer Session.

Weekend Program

The Weekend MBA Program is a program in which students attend a particular course on Saturday and Sunday every third weekend, five weekends per trimester.

Curriculum

The curriculum leading to the Master of Business Administration Degree at Wilkes emphasizes a general, broad-based approach to graduate business education which provides the student with the quantitative and qualitative skills necessary for a manager to succeed. The programs, both evening and weekend, provide advanced training in the functional areas of business through the core sequences and also provide the opportunity for specialization in a selected field through additional training in various areas of Business Administration, Economics, and Accounting. The Graduate Business Program offers MBA candidates a variety of concentrations including Marketing, Management, Management Information Systems, Human Resource Management, International Business, Health Care, Finance, and Accounting.

The School of Business, Society and Public Policy is a member of the American Asembly of Collegiate Schools of Business and the Association of Collegiate Business Schools and Programs.

Objectives

To develop professional managers, with emphasis on the foundation, organization, operation, and control of an enterprise;

To enable individuals to create and evaluate alternative courses of action as a procedure for making decisions;

To develop individuals trained in research and constructive leadership;

To give business persons an understanding of international business policies and practices;

To prepare these business persons for the challenge of understanding and appreciating the cultural and subcultural similarities and differences in various business environments;

To prepare students for further training through post-graduate and/or doctoral studies in business and related disciplines.

The program is designed to provide management education at the master's level for those who have had undergraduate training in business or economics, as well as for interested engineers, scientists, and others with varied undergraduate backgrounds.

Admission

An applicant for the MBA program who is a graduate of an approved and accredited college or university and who has had basic courses in Accounting, Business Law, Managerial Finance, Economics, Marketing, Money and Banking, Computer Programming, and Statistics will probably have an adequate background to complete the requirements for a degree in two years.

In addition to University admission requirements, admission to either of the Master of Business Administration Programs (Evening or Weekend) is dependent upon past academic performance (undergraduate grade point average (GPA) and a satisfactory performance on the Graduate Management Admission Test (GMAT). Test results should accompany the application to either of the two programs. Students may take courses in either or both of the programs in pursuit of the MBA Degree. Each student upon admission to the program will be assigned an academic advisor to guide him/her in the program.

Background Undergraduate Course Requirements for Candidates in Master of Business Administration Program:

Accounting	2 semesters	Managerial Finance	1 semester
Business Law	1 semester	Money and Banking	1 semester
Economics	2 semesters (Princ.)	Marketing Principles	1 semester
Statistics	1 semester	Computer Science	1 semester

A grade of D or D+ in any of these Common Professional Component undergraduate courses will not be accepted.

If a student has not taken one of the above courses, but believes that he/she may possess the information normally taught in that course, he/she may request a challenge examination. Interested students should contact the Program Director. A fee of $35 per credit will be assessed for each challenge examination. Students

requesting a challenge examination must present a receipt from the Financial Management Office before the examination will be administered.

Normally the student is advised to remove any deficiencies existing in the background undergraduate courses first, then to take the core courses, and then to take the electives.

Degree Requirements

All candidates for the Master of Business Administration Degree must complete a total of **thirty-three** credits of graduate work in 500-level courses. Eighteen of these thirty-three credits must be in core courses. All candidates must complete ACC 501 or an advanced Accounting course; BA 502; BA 507; BA 509; ECON 505; and ECON 510. (Students with a minimum preparation in Accounting are urged to take ACC 501; students with twelve or more credits earned in Accounting will not be admitted to ACC 501, but must substitute ACC 561, 562, 563, 564, 565 or 566.) The other fifteen of the thirty-three credits must be drawn from one or more areas of specialization. At least six credits must be in one concentration. The remaining nine credits may be allocated among the concentrations in any fashion.

Master of Business Administration (MBA)

Courses of Instruction

CORE COURSES (18 semester hours required)

The formal policy of The School of Business, Society, and Public Policy is that all core courses must be taken in the traditional fashion. They may not be taken on an independent study basis.

ACC 501.
FINANCIAL AND MANAGERIAL ACCOUNTING — **Three credits**

A basic understanding of both internal and external accounting principles and techniques with appropriate application to decision models. Financial and managerial accounting concepts and issues are considered from the viewpoint of the report user.

Undergraduate Requirements: 2 semesters of Accounting Principles, 1 semester of Managerial Finance.

Students with 12 credit hours or more of accounting must fulfill the accounting core requirement by taking one of the following: Acc 561, Acc 562, Acc 563, Acc 564, Acc 565 or Acc 566. (No independent research.)

BA 502. MANAGEMENT SCIENCE — **Three credits**

An introductory survey of quantitative decision-making techniques and appropriate applications from the perspective of the user-client. Emphasis is upon the construction of optimization and decision models and the development of efficient solution algorithms.

Undergraduate Requirement: Computer Science.

BA 507. BUSINESS AND SOCIETY — **Three credits**

This course deals with the problems of the responsible business manager in a private enterprise society, particularly those problems dealing with policy-making and administration when both economic and non-economic factors, including ethical considerations, are involved. Questions are raised as to the kinds of responsibility and the extent of responsibility business managers have to the goals of our society and to the global society, to the communities in which they operate, to the people they employ, and to governmental policies, as well as to the stockholders of their own firms.

Undergraduate Requirement: Business Law.

BA 509.

STRATEGIC MANAGEMENT AND BUSINESS POLICY — **Three credits**

The capstone course integrates a business approach to strategic decision-making which encompasses the business functions of marketing, production, finance, and human resource management. The course will facilitate both conceptual and experiential integration of functional concepts and techniques from foundation courses in the business curriculum.

Prerequisite: Minimum of 18 M.B.A.-level completed credits with all core M.B.A. courses completed or currently being taken.

ECON 505. MANAGERIAL STATISTICS — **Three credits**

An introductory graduate course in techniques, limits, and areas of application of statistical techniques.

Undergraduate Requirement: Statistics.

ECON 510. MANAGERIAL ECONOMICS — **Three credits**

Problems of the firm. Price and output determination with analysis of cost and demand functions in markets of various types and under various conditions of business. The course will deal with the application of economic theory to business practice.

Prerequisites: 2 semesters of Economics, Ec 505.

Accounting

ACC 561. CORPORATE FINANCIAL REPORTING — **Three credits**

The study of corporate reporting practices and principles in contemporary accounting. Special attention is given to the authoritative pronouncements of the Financial Accounting Standards Board and the Securities and Exchange Commission.

Prerequisite: 12 credit hours of accounting.

ACC 562. FINANCIAL AND TAX PLANNING — **Three credits**

Analysis of federal tax regulations and interpretations. Stress will be placed upon the timing of business transactions and the tax implications in choosing financial alternatives.

Prerequisite: 12 credit hours of accounting.

ACC 563. ACCOUNTING POLICIES AND PRACTICES — **Three credits**

A review of generally accepted auditing standards and the theories supporting them. Includes application of auditing techniques and the legal liabilities of the auditor. In addition, the role of the internal auditor, with an emphasis on the objectives, organization, and operation of the internal audit in the private sector, will be examined.

Prerequisite: 12 credit hours of accounting.

ACC 564. EVOLUTION OF ACCOUNTING THOUGHT — **Three credits**

A comprehensive review of the way in which accounting policies, practices, and ideas have developed over time.

Prerequisite: 12 credit hours of accounting.

ACC 565. PROFESSIONAL SEMINAR — **Three credits**

Discussion of current accounting research, literature and theory; consideration of the role of the accountant in management advisory services.

Prerequisite: 12 credit hours of accounting.

ACC 566. ACCOUNTING INFORMATION SYSTEMS — **Three credits**

An examination of the systems employed to process and sort business events so as to provide the functions of financial reporting, internal responsibility accounting, decision support, internal control, and modeling.

Prerequisite: 12 credit hours of accounting.

FINANCE

BA 551. INVESTMENT AND PORTFOLIO MANAGEMENT **Three credits**
An examination of the methods of security analysis and market timing for both speculative and investment-quality instruments. Focus is upon traditional techniques of portfolio management, as well as Modern Portfolio Theory.
Prerequisite: Investment principles or permission of instructor.

BA 552. FINANCIAL MANAGEMENT **Three credits**
An investigation into the theories and techniques of financial planning and analysis. Working capital management and cash budgeting are given special attention. Also emphasized are capital budgeting issues, such as capital asset acquisition, capital structure considerations, and the evaluation of financing options.
Prerequisite: Undergraduate Finance.

BA 553. FINANCIAL MARKETS & INSTITUTIONS **Three credits**
An analysis of the structural relationships between and among financial enterprises, including the role of government regulators. Focus is upon the dynamics of the funds allocation process and the decision-making procedures of financial managers.

BA 554. MANAGERIAL FINANCE SEMINAR **Three credits**
Problems in managerial finance. Special topics.

BA 557. PENSION ADMINISTRATION **Three credits**
The problem of the superannuated employee is central. Social Security is viewed as underlying the solution of the problem. Defined benefit and defined contribution plans arising from employer responsibility are stressed.

BA 558. RISK MANAGEMENT AND INSURANCE **Three credits**
A study of the principles of risk management and insurance applied to the needs of individuals and organizations. Course content includes the tools of risk management, types of insurance contracts, insurer operations, and analysis of public policy issues associated with risk management and insurance.

BA 559. ESTATE PLANNING **Three credits**
Estate Planning is designed to provide insights for developing a rational program for asset transfers during life time and at death. The central theme is peace of mind that an optimal mode of transfer with minimal shrinkage due to transfer costs and taxation is chosen.

HEALTH CARE

The Health Care concentration requires nine credits in Health Care designated courses. A minimum of nine credits in Health Care designated courses may count toward the satisfaction of the MBA degree requirements.

Please see the section on Health Administration, pages 29 through 34, for description of Health Care courses.

HUMAN RESOURCE MANAGEMENT

BA 521. ORGANIZATIONAL THEORY **Three credits**
This course analyzes the various strategies and techniques available to managers in developing changes in organizational structure. The course integrates the effect of structure on the organization's culture, human resource planning and ability to accomplish a strategy.

BA 525. HUMAN RESOURCE MANAGEMENT **Three credits**
A survey of the activities and decision-making functions of the human resource manager, including manpower planning, employee rights, EEOC dealings, training and development, employee evaluation techniques, compensation packages, and recruitment of personnel.

BA 526. EMPLOYEE COMPENSATION AND BENEFITS **Three credits**
This course is designed to explore the development of employee compensation and benefit programs. The managers of the future will require a solid understanding of the need for compensation packages that motivate employee performance in a positive manner. Special emphasis will be placed on understanding salary schedules, health benefits, retirement planning, flexible benefits, and benefit cost management.

BA 527. PERSONNEL TRAINING AND DEVELOPMENT **Three credits**
This course is designed to prepare the manager to develop, implement, and evaluate employee training programs. Emphasis will be placed on the theory and research of employee training and development programs. Special attention will be placed on the determination of training needs, development of training objectives, and evaluation of training outcomes.
Prerequisite: BA 525.

BA 528.
LEGAL ISSUES IN HUMAN RESOURCE MANAGEMENT **Three credits**
This graduate level course provides an up-to-date application of legal principles to current business situations. Constitutional, statutory, administrative and case law are all covered. The central theme is the impact that laws have on the processes of management in the human resource area and the factors influencing decision-making models.

ECON 506. LABOR-MANAGEMENT ECONOMICS **Three credits**
A course dealing with issues and trends in collective bargaining and industrial relations today. The shifting roles and relationships of labor, management and government will be addressed. Problems of maintaining the labor force and the social aspects of industry will be dealt with.

ECON 533. THE LABOR MARKET **Three credits**
Economic and non-economic forces influencing labor supply and demand will be studied. Determinants of the labor force, unemployment, labor mobility, and the functioning of the labor market will be investigated.

INTERNATIONAL BUSINESS

BA 511. MODERN INTERNATIONAL COMMERCE **Three credits**
This course is designed to introduce the student to the practical principles and methods of international marketing. Subjects covered will include the development and management of exports and imports, channels of trade, the mechanics of international finance, foreign credits, technical procedures and documentation.

BA 571. CROSS-CULTURAL ANALYSIS AND PERSPECTIVE **Three credits**
This course uses an anthropological perspective in the examination of international business culture. The course demonstrates how viewing international business in its cultural context can improve American business persons as trading partners, increase American competitiveness and enhance our confidence and enjoyment as participants in the international marketplace.

BA 572.
THEORIES OF THE MULTINATIONAL ENTERPRISE **Three credits**
This course critically appraises the main economic and behavioral theories of Foreign Direct Investment, International Production and the Multinational Enterprise.

BA 573. INTERNATIONAL BUSINESS MANAGEMENT **Three credits**
This is an integrative capstone course utilizing a system perspective to analyze complex organizational issues and problems from the viewpoint of the international business firm. Cases and written reports are used extensively.

BA 574.
LEGAL ENVIRONMENT OF INTERNATIONAL TRADE **Three credits**
Legal considerations that apply to U.S. business in the international marketplace. The course analyzes issues involving contract negotiations and enforcement, venue, jurisdiction, arbitration, financing, international conventions, the European Economic Community, American trade laws, and multi-national business issues. The course uses a combination of statutory review, case analysis and commentary.

Management

BA 521. ORGANIZATIONAL THEORY **Three credits**
This course analyzes the various strategies and techniques available to managers in developing changes in organizational structure. The course integrates the effect of structure on the organization's culture, human resource planning and ability to accomplish a strategy.

BA 522. PRODUCTION/OPERATIONS MANAGEMENT **Three credits**
Topics will include operations management, strategies for competitive advantage, forecasting, product development, job design, standards and work measurement, project management, quality control and analysis, plant layout, space allocation modeling, locational decision making, materials management, capacity planning, basic scheduling models and operations support.

BA 523. MANAGEMENT SEMINAR I **Three credits**
This seminar brings to bear current management techniques on a variety of problems. Students will be guided in theoretical readings and will apply their knowledge in seminar discussions.

BA 524. MANAGEMENT SEMINAR **Three credits**
This seminar has a research orientation. Research, objectives, techniques and methodology will be dealt with.

BA 525. HUMAN RESOURCE MANAGEMENT **Three credits**
A survey of the activities and decision-making functions of the human resources manager, including manpower planning, employee rights, EEOC dealings, training and development, employee evaluation techniques, compensation packages, and recruitment of personnel.

Management Information Systems

BA 508. MANAGEMENT INFORMATION SYSTEMS **Three credits**
This course introduces the fundamental concepts underlying the design, implementation, control, and evaluation of computer-based information systems, evaluation of computer-based information systems, office automation, information reporting, and decision-making. The use of computer productivity skills will be stressed.
Prerequisite: CS 115 or its equivalent.

BA 581. DATABASE MANAGEMENT SYSTEMS **Three credits**
A study of the principles of database design, analysis and implementation. Managerial concerns of access, protection, and database security, three-schema architecture and file structures.
Prerequisite: BA 508.

BA 583.
DATA COMMUNICATIONS & DISTRIBUTED PROCESSING **Three credits**
An introduction to the foundations of data transmission and communication techniques. Types of networks are identified and discussed. Security and managerial concerns of networks are focused upon as well as error detection and correction techniques.
Prerequisite: BA 508.

BA 585. SYSTEMS ANALYSIS AND DESIGN **Three credits**
An introduction to the theory and application of the systems approach as it pertains to the planning, analysis, and implementation of the operations of organizations. Prototyping and case tools for creating software will also be discussed.
Prerequisite: BA 508.

BA 587. DECISION SUPPORT SYSTEMS **Three credits**
Problem recognition and approaches to problem solving are focused upon. Model formation, design, and evaluation techniques are discussed. Decision support tools are used to assist in modeling and prototyping.
Prerequisite: BA 508.

Marketing

BA 511. MODERN INTERNATIONAL COMMERCE **Three credits**
This course is designed to introduce the student to the practical principles and methods of international marketing. Subjects covered will include the development and management of exports and imports, channels of trade, the mechanics of international finance, foreign credits, technical procedures and documentation.

BA 512. PRICE POLICY AND PROCEDURE **Three credits**
This course describes the basic pricing process, relates it to pricing decisions, and attempts to provide a systematic pricing program for managers to follow. Topics covered will include internal and external factors in pricing decisions, pricing models in various kinds of market structure, the special problems of manufacturers and distributors, as well as the management of resources used in the production process and hiring decisions.
Prerequisite: Microeconomics, Macroeconomics.

BA 513. CONSUMER BEHAVIOR **Three credits**
Analyzes the fundamental concepts and ecology of human behavior which impact upon consumer decision making and marketing strategies. Cognitive variables, consumer characteristics and environmental variables are explored and marketing implications are developed.
Prerequisite: Marketing Principles.

BA 514. MARKET RESEARCH AND EXPERIMENTATION **Three credits**
Examines the principles and techniques of scientific market research (problem definition, research design, sampling, questionnaire development, data collection and analysis, interpretation, and evaluation.) Develops research process skills through student designed and implanted research projects.
Prerequisite: Marketing Principles, EC 505.

BA 515. MARKETING MANAGEMENT SEMINAR **Three credits**
This seminar deals with the planning, organizing, directing, and controlling of resource utilization as it applies to the marketing function. Students share responsibility for assimilating and presenting material for discussion.
Prerequisite: Microeconomics, Macroeconomics, Marketing Principles.

Special Courses

ACC 550.
TOPICS **Three credits**
Special topics in accounting. This course will be offered from time to time as interest and demand justify it.

ACC 595-596.
INDEPENDENT RESEARCH **Three credits each**
Independent study and research for advanced students in the field of the major under the direction of a staff member.

BA 550.
TOPICS **Three credits**
Special topics in business administration. This course will be offered from time to time as interest and demand justify it.

BA 595-596.
INDEPENDENT RESEARCH **Three credits each**
Independent study and research for advanced students in the field of the major under the direction of a staff member.

ECON 550.
TOPICS **Three credits**
Special topics in economics. This course will be offered from time to time as interest and demand justify it.

ECON 595-596.
INDEPENDENT STUDY **Three credits each**
Independent study and research for advanced students in the field of the major under the direction of a staff member.

Health Administration

Master of Health Administration (MHA)

Purpose

The graduate program in Health Administration offers course work leading to the Master of Health Administration (MHA) degree. The MHA prepares students to assume entry to mid-level management positions in various types of health service institutions. The purpose of the program is to educate and train professional administrators who will be able to provide organizations with creative and innovative leadership in an era of ongoing change. The Health Services Administration Department also serves as a resource center by providing assistance to community health-related agencies and programs and by conducting research in the areas of health policy and management. The core objectives of the MHA include:

1. To develop creative and innovative health services managers skilled in leadership, negotiation and the art of managing change;
2. To develop the analytic and critical thinking skills necessary for problem solving and decision making in a rapidly changing health policy environment;
3. To prepare professional managers not only to fuse the traditional mission of hospitals and ancillary health-related organizations with the movement to managed care and managed competition, but also incorporate the concepts of social responsibility and distributive justice into the next generation of health services institutions.

The MHA at Wilkes provides both health care professionals and professionals from a variety of disciplines with the opportunity to pursue graduate study while working full time. The 39-credit degree can be completed either on a full or part-time basis. Classes are offered evenings and on weekends. **Weekend courses are held on Saturday and Sunday every third weekend, five weekends per trimester.**

Admission Requirements

Applications are invited from individuals who have earned undergraduate or graduate degrees in any discipline or field of study. To be considered for admission, the applicant must meet the following minimum requirements:

1. GPA of 2.75 or better on a 4.0 scale for undergraduate coursework or a minimum cumulative graduate GPA of 3.0 for nine or more hours of graduate credit;
2. Submit to the Graduate Admissions Officer a completed graduate application for admission with a payment of a $30.00 application fee;
3. Submit two letters of recommendation from previous academic faculty and/or from current or previous supervisors, if employed. Letters of recommendation should attest to the student's fitness for managerial leadership and discuss interpersonal and organizational skills;
4. Submit a professional career goal statement. The goal statement should contain the following information: a) What are your basic skills? b) How have you acquired these skills? c) Which skills would you like to improve? d) What do you hope to achieve and do with the MHA degree? e) What type of position and/or promotion would you be seeking upon graduation?
5. Have completed one semester of college-level coursework in accounting, microeconomics and statistics with a grade "C" or better. Students lacking

these prerequisite courses will be provisionally admitted to the program. If **the prerequisite courses have not been completed prior to admission, they must be completed during the first calendar year or before 12 credit hours of study in the MHA program are completed, whichever comes first.** These requirements may be met by completing the courses at any accredited college or university or may be taken in the School of Business, Society and Public Policy at Wilkes. Credit hours earned in prerequisite courses cannot be applied toward the 39 semester hours required to qualify for the MHA degree;

6. Present evidence of personal achievement, intellectual ability and professional promise through the application process and/or a personal interview with the MHA Chairperson or faculty.

Degree Requirements

Thirty-nine (39) credit hours are required for the MHA. These consist of twenty-seven (27) credits in CORE courses and twelve (12) hours in ELECTIVE courses. As part of an individualized study plan, students select elective courses which are geared toward a concentration or area of interest. Students will consult with their advisor to develop a menu of possible elective courses from which students may choose their twelve (12) hours of elective courses. However, a minimum of six (6) hours of elective courses must be completed from courses offered by the Department of Health Services Administration.

To complete the requirements for the MHA, all degree candidates must fulfill the following exit requirements. A student who fails either of the exit requirements may retake it only once. The exit requirements consist of the following:

a. The written comprehensive exam is a three-hour exam, consisting of two general questions and one question in the student's area of specialization/interest. At least 33 credit hours must be completed before taking the comprehensive examination. The comprehensive examination is given during the Spring and Fall Semesters.

b. A 15-20 minute oral presentation follows the written comprehensive examination. This presentation must be approved by the faculty through the H.S.A. Chairperson or MHA Program Director. The presentation should demonstrate proficiency at addressing a problem while showing professional self-understanding, sources of judgement, and patterns of reasoning. After the presentation, the H.S.A. faculty committee will engage in a constructive dialogue regarding content of the presentation.

The CORE (27 hours)

The MHA CORE is interdisciplinary in nature, encompassing health administration and planning, economics and finance, leadership development, and quantitative methods. The CORE consists of the following courses:

HSA 551. Health Policy and Politics
HSA 552. Organizational Theory and Behavior in Health Administration
HSA 553. Leadership Skills and Executive Development for Health Professionals
HSA 554. Medical Sociology
HSA 555. Financial Management in Health Care Organizations
HSA 556. Quantitative and Applied Methods in Health Administration
HSA 557. Strategic Planning and Marketing in Health Care Institutions
HSA 558. Health Economics
HSA 559. Health Administration Colloquium: Capstone Course

Special Characteristics of the MHA Program at Wilkes

The Health Services Administration Program at Wilkes practices intensive self-directed student advising. Once a student has been accepted into the program, the student is immediately assigned an advisor. Advising sessions are used as an opportunity to communicate effective managerial role models, changing job market conditions, student career ambitions and strengths, and to identify course scheduling options. The key focus of the advising process is to encourage students to move from their strength of present competence to a responsible and rewarding career in health care management.

Most graduate courses are taught in a seminar format. Core and elective courses are designed to expose students to innovative approaches to problem-solving by using various teaching methodologies, including case methods, simulations, mock hearings, field research, group assignments, individual projects, community-expert panels, and student designed independent study. Small classes ensure active student participation and professional interchange among various health professionals. Faculty members in seminars encourage students to develop team building skills essential to successful management in contemporary health services organizations. Wilkes has an excellent microcomputer laboratory where students acquire hands-on computer experience.

The HSA program benefits from an ongoing relationship of mutual support and interest with the Northeast Pennsylvania health community. As part of this commitment, community health care leaders are actively involved as instructors, guest speakers, and preceptors in the educational process of the MHA students.

Courses of Instruction

Core Courses (27 credits required)

HSA 551. HEALTH POLICY AND POLITICS **Three credits**

The health care industry is becoming the largest segment of the American economy. This course focuses on the political process and policy approaches to health care issues since the New Deal. The course focuses particularly on processes through which public policies affecting health care service delivery are generated and promoted or opposed, adopted or rejected, implemented or evaluated. Phases of the policy process will be analyzed and distinctions drawn between public and private policymaking, and alternative analytic models of the policy process will be examined for their plausibility and utility. Among the topics explored are interest group activities, governmental financing, control processes, mass-elite confrontations, competition of rival ideologies, partisan appeals for electoral support, struggle to win control over governmental decision-making, and the general problems of policy implementation in a system characterized by changing intergovernmental relations.

Offered every fall.

HSA 552. ORGANIZATIONAL THEORY AND BEHAVIOR IN HEALTH CARE INSTITUTIONS **Three credits**

This course examines relevant theories of management and the behavioral sciences as they relate to effective administration of health care institutions. The course deals with the broader question of institutional effectiveness: Can health services organizations become more efficient and effective systems through proper management? Throughout the course this question is addressed by discussing important issues, such as the role of the health manager in motivating and leading work groups; organizational design; change and innovation; communication and coordination; organizational performance; conflict and integration; and adaptation to the external environment. In this course health care organization is perceived as an open system which requires constant interaction with the external environment.

Offered every fall.

HSA 553. LEADERSHIP SKILLS AND EXECUTIVE DEVELOPMENT FOR HEALTH CARE PROFESSIONALS — Three credits

The course focuses on two central issues: (a) what makes a person an effective leader in health care organizations, and (b) how does a leader translate intention into reality, communicate those intentions successfully, empower others, and know when and how to stay on course and when to change? Examines leadership theories and their application for the health care executive. Emphasizes how to become an innovative leader by achieving mastery over the noisy, incessant, and changing health care environment, rather than simply reacting and living in a perpetual state of shock. Among the leadership skills covered in the course are team-building, vision, empowerment, organizational learning, negotiation, effective communication and alignment, persistence, consistency and focus, creative thinking, sharing of knowledge without letting intentions become orders, openness to influence from those who question the most basic truths, inspiring others to make commitment, manage change, and transform doubts into a common purpose.

Prerequisite: HSA 552, or permission of instructor.
Offered every spring.

HSA 554. MEDICAL SOCIOLOGY — Three credits

Develops critical understanding of the health care system as it relates to its historical and cross-cultural dimensions, as well as to microsocial and macrosocial levels of analysis. Topics include the development of the medical profession, theories of disease, illness behavior, the stress process, access to care, the medical division of labor, the health care delivery system in its political-economic context, and comparisons to other modern health care delivery systems.

Offered every summer.

HSA 555. FINANCIAL MANAGEMENT IN HEALTH CARE ORGANIZATIONS — Three credits

Provides an understanding of the primary facets of health care financial management. Includes such topics as institutional fiscal policies, accounting concepts and practices, reimbursement theory, financial statistical reporting, cost containment, and the use of financial data as management tools.

Prerequisite: Undergraduate Accounting.
Offered every fall.

HSA 556. QUANTITATIVE AND APPLIED METHODS IN HEALTH ADMINISTRATION — Three credits

This course is designed to enable health professionals to apply basic descriptive and inferential statistics to problems within their fields and to provide techniques of critical reading of the health care literature. Topics will include designing a study, data collection and display, testing of hypotheses and evaluating the significance of results. Extensive use will be made of statistical packages, graphics programs, spread sheets and data base management programs for micro and mainframe computers. Programming ability is not assumed.

Prerequisite: Undergraduate Statistics.
Offered every fall.

HSA 557. STRATEGIC PLANNING AND MARKETING IN HEALTH CARE INSTITUTIONS — Three credits

This course develops strategic planning and marketing concepts and applies them to health care institutions. Topics to be covered include the essential components of planning, environmental forecasting, the process of change, and evaluation techniques. The focus will be both macro and micro in nature. Addresses principles and practices of health care marketing.

Offered every spring.

HSA 558. HEALTH ECONOMICS — Three credits

This course utilizes microeconomic theory to analyze the three major problems in the current health care system: costs, access, and health levels. Many of the economic concepts such as demand and supply theory, market structure, opportunity cost, cost-benefit analysis are examined, and possible solutions to these problems are offered.

Prerequisite: Undergraduate Microeconomics.
Offered every fall.

HSA 559. HEALTH ADMINISTRATION COLLOQUIUM: CAPSTONE COURSE — Three credits

A public affairs colloquium which integrates the disparate interdisciplinary perspectives, concepts, ideas, and techniques students have acquired through the M.H.A. curriculum. Develops a critical appreciation of one's own personal perspective and competing perspectives as they relate to: (a) policy, organizational and leadership issues; and (b) the future of health care and the student's place in it.

Prerequisite: 33 hours, including the completion of all CORE courses.
Offered every spring.

ELECTIVES (12 CREDITS REQUIRED: MINIMUM 6 IN HSA)

HSA 560. TOPICS IN HEALTH SERVICES ADMINISTRATION — Three credits

Advanced study of various topics of special interest not extensively treated in regular courses.

Offered as interest and demand justify it.

HSA 561. PERSPECTIVES ON AGING — Three credits

Human development from adulthood through old age is analyzed. Main focus is upon social and emotional changes associated with various states of later adult life. The specific relationships between the graying of America, the subsequent development of chronic diseases and alternate health care delivery systems for the elderly will be discussed in detail. Emphasis throughout the course will be on the older adult. Physiological development and the differentiation between normal age changes and disease states will be explored.

Prerequisite: Graduate Standing.

HSA 562. LONG-TERM CARE ADMINISTRATION — Three credits

This course will emphasize the use of management principles and skills in long-term care institutions. Particular emphasis will be placed on planning and controlling along with better usage of manpower to increase productivity.

HSA 564. HEALTH CARE MARKETING — Three credits

A study of marketing as it is applied specifically in the health care industry. Emphasis is placed on product determination, use of controllable variables, targeting, market-mix analysis, and feasibility analysis relative to "social good," third-party financing, and legal and traditional restraints.

HSA 567. HEALTH CARE SUPERVISION — Three credits

This course is designed to build the skills and conceptual underpinnings of today's line manager in health administration. Objectives include: 1) line manager skills development in the areas of planning, employee development, daily communications, and unit performance assessment; 2) self-conscious development of a management style maximizing organizational effectiveness and efficiency; and 3) expanded awareness of strategies for dealing with operating constraints in mid-level management positions.

HSA 568. LABOR MANAGEMENT RELATIONS IN HEALTH CARE **Three credits**

Explains the basis for labor-management relations in health care institutions. The collective bargaining process, contract administration and labor relations for public employees will be examined in great detail. Particular attention will be paid to the right of health care employees to strike and the effect it has on the health care industry.

HSA 569. MANAGEMENT OF HEALTH CARE DIVERSIFICATION AND BUSINESS PARTNERSHIP **Three credits**

Examines the organization and management of ambulatory care practice, including application of research and theory. Provides skills related to planning, coordinating, marketing, quality assessment, consumer and provider satisfaction, personnel management, and financing ambulatory care facilities. Focuses on solo and medical group management.

HSA 573. CONTEMPORARY PRACTICES AND PROBLEMS IN HOSPITAL ADMINISTRATION **Three credits**

Focuses on the administration of hospitals and its multi-faceted problems. Examines the basic organization of hospital operations, including functions of the board of directors, interrelationships of clinical, support and administrative departments, and the role of the hospital administrator/CEO in providing effective leadership. Extensive case studies are used.

HSA 574. MEDICAL MANAGEMENT INFORMATION SYSTEMS: A MANAGERIAL PERSPECTIVE **Three credits**

Provides the conceptual foundations, structures and developments of medical management information systems. Focuses on design and implementation of operational health care management information systems including manpower planning and productivity, financial planning and monitoring, quality assurance, patient care systems and the various uses of computer technology in health care.

HSA 577. PRINCIPLES OF EPIDEMIOLOGY **Three credits**

Identifies factors relative to man and his environment which influence the occurrence of disease and provides a basis for programs in preventative medicine and therapeutic modalities and of new organizational patterns of health care delivery. Topics, among others, include epidemiological methods; indices of morbidity and mortality; evaluation of diagnostic and screening tests; measurement of disease risk; health services evaluation; and legal, ethical and policy aspects of epidemiology. Emphasis on clinical trials, prospective studies, and case-control studies. Selected epidemiological diseases, such as measles, cardiovascular, and hospital acquired infections are discussed.

HSA 590. GRADUATE INTERNSHIP **Three credits**

Designed to provide practical administrative experiences in a health services agency or organization. The course is relevant only for students who do not have any working experience in a health care setting.

Prerequisite: Permission of the Program Director at least three months in advance and completion of core courses, except HSA 559.

HSA 595. HEALTH SERVICES INDEPENDENT STUDY **Three credits**

Independent study and research for advanced students.

Offered as required.

School of Liberal Arts and Human Sciences

Robert J. Heaman, Ph.D. Dean

Education

Douglas Jay Lynch, Ph.D. *Chairperson*

Rosemary Williams, D.Ed. *Associate Chairperson and Director of Graduate Extension and Teacher Education Programs*

Master of Science in Education

Purpose

Graduate study in education is offered primarily to enable teachers to enhance their preparation for classroom leadership. Study in various academic fields is required as well as in professional courses.

Programs are offered in Education (with options in Educational Computing, and Educational Development and Strategies); Secondary Education/Biology; Secondary Education/Chemistry; Secondary Education/English; Secondary Education/History; Secondary Education/Mathematics; and Secondary Education/Physics.

Wilkes University houses a Regional Computer Resource Center (RCRC) which provides microcomputer laboratories, as well as an extensive educational software library, used by students in the M.S. in Educational Computing degree program.

The RCRC also provides microcomputer facilities and technical support to all teachers enrolled in graduate study at Wilkes. Additional services include:

1. Free graduate level computer literacy and science education courses to K-12 science and/or mathematics teachers in Pennsylvania's public and nonpublic schools;
2. Training for K-12 teachers in microcomputer topics via short workshops and seminars; and
3. Assistance to school districts in designing computer-oriented curricula.

The RCRC is funded by the Pennsylvania Science Teachers' Education Program (PA STEP) and administered by the Pennsylvania Higher Education Assistance Agency.

Special Features of the Program

The program is arranged so that students may pursue the degree on a full- or part-time basis. Late afternoon and evening classes are offered to enable full-time teachers within a reasonable distance from Wilkes-Barre to take courses toward fulfillment of degree requirements during the academic year. Credits may also be earned during the summer sessions.

Admission

For admission to graduate study in education, the applicant must have a baccalaureate degree from an accredited institution, with an appropriate major, and a teaching certificate.

Students deficient in any phase of these requirements may, at the discretion of the academic department, and the Education Department, be granted provisional admission. Deficiencies must be made up satisfactorily before full admission to graduate study will be granted.

Students may take graduate courses as non-degree students. The University's general rule for non-degree students (see page 10) limits the number of credits to six. However, a student may take Professional Development courses to keep abreast with the latest trends in education (see Area V and Area VI), as a non-degree student, and there is no limit to the number of professional development courses that a graduate student may take. Nonetheless, degree-seeking students are restricted to using no more than six credits of professional development courses in their degree programs.

Degree Requirements

All candidates for the Master of Science in Education degree must complete a program of at least thirty credits; twelve credits must be in education, six in Area I and three in Area II.

A candidate for a Master of Science in Education with an option in Educational Computing must complete six credits in Area I, and Education 522, 581, 582, 583, 585, 587, 588, and 589.

A candidate for the Master of Science in Education who is a practicing teacher may elect the option in Educational Development and Strategies. The requirements for this degree are: two courses in Area I; one course in Area II, Ed 534 or 541; four courses from Area V (only two from 550, 551, 552, 553, and 580); and six elective credits in education. Candidates who wish to complete a thesis may do so under this option by using the six credits of electives to enroll in Ed 525 and Ed 590.

A candidate for the Master of Science in Education degree whose program is in one of the secondary school teaching subjects must complete eighteen credits in the appropriate cognate area; three of the twelve credits in education must be in Area IV.

Program of Study

Advisors are assigned when students are admitted to the graduate program. To plan your program of studies fully, consult with your advisor. Graduate courses are offered each semester, with the greatest variety during the summer sessions. Fall and Spring courses are usually offered during the evening. All transfer credits must be approved by the Chairperson of the Education Department (See page 12).

Second Master's Degree

An applicant who has a master's degree from Wilkes University or is working on a master's degree, may obtain a second master's degree if the majors, programs and/or options are different. Up to six credits of course work used to satisfy the requirements for the first degree may be applied to the second; all other catalog requirements and credit requirements in courses must be fulfilled. A student who opts for a second degree **MUST** submit a written request to the Graduate Admissions Officer.

Courses of Instruction

Area I — Foundations of Education

EDUCATION 510.
PSYCHOLOGICAL FOUNDATIONS OF EDUCATION **Three credits**
A study of human development and learning, application of psychological principles in the practice of education.

EDUCATION 511.
PHILOSOPHICAL FOUNDATIONS OF EDUCATION **Three credits**
An examination of philosophical issues which bear upon American education. The problem of relating theory to practice is considered.

EDUCATION 512. SOCIAL FOUNDATIONS OF EDUCATION **Three credits**
An introduction to the history, scope, materials and methods of the sociological analysis of education. Instruction includes the concepts of culture, socialization, stratification, social control and change as they relate to formal education.

EDUCATION 513.
COMPARATIVE FOUNDATIONS OF EDUCATION **Three credits**
An analytic study of educational patterns in contemporary societies. Educational policies and institutions are studied in their cultural context. Educational patterns of developed and developing nations are described, analyzed and compared; examples from each pattern are examined.

EDUCATION 514.
HISTORICAL FOUNDATIONS OF EDUCATION **Three credits**
A survey of the great landmarks of Western education from antiquity to the recent past. The development of primary, secondary, and higher education; objectives; curricula; methods; and systems of education are considered. Attention is given to some contemporary problems in their historical perspectives.

EDUCATION 515. COGNITION **Three credits**
This course provides in depth study of the processes required for students to process information, including perception, attention, memory, encoding, retrieval, problem solving, and the information processing requirements of reading and writing. Consideration of problem solving in specific subject areas is also covered.

EDUCATION 578. SCHOOL LAW **Three credits**
An examination of school law at the federal, state and local levels; review, discussion and analysis of court decisions which affect schools.

Area II — Professional Skills in Education

EDUCATION 520. TESTS AND MEASUREMENTS **Three credits**
Study of characteristics, construction, and use of various standardized and non-standardized measuring instruments; statistics through basic correlation.

EDUCATION 521. STATISTICS IN EDUCATION **Three credits**
Correlation and regression through statistical inference.
Prerequisite: Education 520 or equivalent.

EDUCATION 522.
EDUCATION STATISTICS AND COMPUTER SIMULATION **Three credits**
This course utilizes the microcomputer for statistical inference. Students also have experiences in system modeling and techniques to simplify and represent relationships in complex problems.

EDUCATION 525. EDUCATIONAL RESEARCH **Three credits**
A study of procedures used to collect, analyze and present data; critical examination of representative educational research reports.
Prerequisite: Education 520 or equivalent.

Area III — Elementary Education

EDUCATION 531. CHILDREN'S LITERATURE **Three credits**
A study of methods and materials appropriate for elementary school instruction in literature.

EDUCATION 532-533.
PROBLEMS IN ELEMENTARY EDUCATION **Three credits**
Advanced study of materials and methodology appropriate for elementary classroom instruction.
Section A Mathematics
B Science
C Language Arts
D Social Studies
E Special Subjects

EDUCATION 534. ELEMENTARY SCHOOL CURRICULUM **Three credits**
A study of curricula offered in elementary schools, grade placement of content, articulation of subject matter areas, development of specialized programs.
Prerequisite: Fifteen graduate credits.

EDUCATION 536.
ELEMENTARY SCHOOL READING INSTRUCTION **Three credits**
Lectures and demonstrations cover the psychology of the reading process, appraisal of reading needs, directed reading activities, word recognition and comprehension abilities.

EDUCATION 537. READING DISABILITIES **Three credits**
Lectures and demonstrations cover the identification, diagnosis, and classification of individuals with reading problems at all ages and levels of instruction.
Prerequisite: Education 536.

Area IV — Secondary Education

EDUCATION 540. SPECIAL METHODS IN
SECONDARY SCHOOL INSTRUCTION **Three credits each semester**
Section A Biology
B Chemistry
C Environmental Science
D English
E History
F Mathematics
G Physics
H Reading
I Social Studies
J Educational Theater
K Science

EDUCATION 541. SECONDARY SCHOOL CURRICULUM **Three credits**
A study of secondary school curricula, traditional programs, recent developments, provisions for innovation and individualization.

EDUCATION 542. EXTRA-CURRICULAR ACTIVITIES **Three credits**
A study of the development of extra-curricular activities, organization and administration, the role of the sponsor, recent trends.

Area V — Educational Development and Strategies

Education 550-553 were developed by educators at Performance Learning Systems, Inc. The coursework is tightly structured, utilizing programmed learning with integrated audio-visual materials. Students conduct research in their own classrooms and report regularly on their success in employing strategies taught. Instructors for these courses receive special training prior to assignment.

EDUCATION 550. PROJECT T.E.A.C.H. **Three credits**
Teacher Effectiveness and Classroom Handling (T.E.A.C.H.) deals with clarity of communication, avoidance of confrontation, and techniques to reduce tension in the classroom. This is a Professional Development course.

EDUCATION 551. P.R.I.D.E. **Three credits**
Professional Refinements in Developing Effectiveness (P.R.I.D.E.) treats questioning techniques, non-verbal communication, and the development of contracts to motivate students. This is a Professional Development course.

EDUCATION 552.
TEACHING THROUGH LEARNING CHANNELS **Three credits**
This course utilizes recent brain research, examines individual differences in learning styles, and develops adaptive teaching procedures to accommodate varying cognitive processes. This is a Professional Development course.

EDUCATION 553. PATTERNS FOR I.D.E.A.S. **Three credits**
Patterns for I.D.E.A.S. is designed to explain ways inductive, deductive, analysis and synthesis processes can be taught in classroom lessons. This includes effort management and curriculum decision making. This is a Professional Development course.

EDUCATION 554. TEACHERS COACHING TEACHERS:
A SUPPORTIVE LEARNING PARTNERSHIP **Three credits**
An interactive, seminar style experience to assist classroom teachers in developing skills in a cognitive model of peer observation and feedback.

EDUCATION 555. MODELS OF TEACHING **Three credits**
Examination of information processing, social interaction, personal and behavioral models of teaching; emphasis on practical implementation of these models in teaching situations.

EDUCATION 556. MOTIVATION **Three credits**
This course is designed to present a study of the meaning and importance of the research and concepts pertaining to motivation. Emphasis is placed on theories of motivation, incentives for learning, and the impact of motivation in the classroom.

EDUCATION 557. LEARNING STYLES **Three credits**
Students will study the concept of learning styles and the interaction of learning styles and teaching/classroom procedures.

EDUCATION 562.
REMEDIATION OF LEARNING DISABILITIES **Three credits**
A study of the major areas of learning disability: gross motor development, sensory-motor development, perceptual-motor skills.

Area VI — Educational Computing Courses

EDUCATION 580.
INTRODUCTION TO EDUCATIONAL COMPUTING **Three credits**
The course will provide teachers with basic computer skills and experiences with exemplary courseware and utility software. The course is especially designed for teachers who are computer novices. This is a Professional Development course.
Offered fall, spring, and summer semesters.

EDUCATION 581.
INSTRUCTIONAL PROGRAMMING IN BASIC **Three credits**
Introduction to computer programming using the BASIC language. Topics include BASIC syntax, program modularity and design, simple graphics, and elementary data structures. Emphasis is on application in instructional environments.
Offered fall semesters of odd years.
Prerequisite: Ed 580 or equivalent.

EDUCATION 582.
INSTRUCTIONAL PROGRAMMING IN PASCAL **Three credits**
Pascal programming for microcomputers. Emphasis will be on the use of structured programming techniques. Topics include Pascal syntax, structured programming and design, recursion, and the manipulation of linear data structures. Emphasis is on application in instructional environments.
Offered spring semesters of even years.
Prerequisite: Ed 581/Ed 584 or equivalent.

EDUCATION 583.
COURSEWARE DESIGN AND CONSTRUCTION **Three credits**
Using state-of-the-art technology to design and construct appropriate courseware support and curricula. Topics include the use of authoring software, optical technologies, ISD (Instructional Systems Design) models and strategies geared towards proper courseware design.
Offered fall semesters of even years.
Prerequisite: Ed 581/Ed 584 or equivalent.

EDUCATION 584. LOGO **Three credits**
Introduction to computer programming using Logo and LogoWriter. Topics included are turtle-graphics, words and lists, recursion, "scrapbook" and "microworld" construction and elementary data structure representation.
Offered fall semesters of odd years.
Prerequisite: Ed 580 or equivalent.

EDUCATION 585.
MICROCOMPUTER ASSISTED INSTRUCTION **Three credits**
The course will present models of instructional design to provide a theoretical framework in the application and integration of microcomputer technology into the K-12 curriculum. Participants will develop a portfolio of computer-generated materials for their classroom.
Offered fall semesters.
Prerequisite: Ed 580 or equivalent.

EDUCATION 586. MICROCOMPUTERS IN EDUCATION **Three credits**
An analysis of microcomputer applications designed for various educational settings. Special emphasis is placed on software selection, review and utilization.
Section A Mathematics
B Science
C Language Arts
D Social Studies
E Special Topics
Offered when demand warrants.
Prerequisite: Ed 580 or equivalent.

EDUCATION 587. ALGORITHMIC PROCESS AND DESIGN IN EDUCATIONAL COMPUTING **Three credits**
An investigation into the design, construction and implementation of both linear and non-linear data structures in modern computer environments. Topics also include files and file structures, algorithm design and performance and an analysis of common disk operating systems. Emphasis is on application in instructional environments.
Offered fall semesters of even years.
Prerequisite: Ed 582 or equivalent.

EDUCATION 588. MICROCOMPUTER ORGANIZATION **Three credits**
An exploration into the design of present-day microcomputer systems. Topics include microcomputer architecture and hardware, telecommunications, networking, general operating systems and assembly-language programming.
Offered spring semesters of odd years.
Prerequisite: Ed 587 or equivalent.

EDUCATION 589. INSTRUCTIONAL TECHNOLOGY: MODELS AND METHODS **Three credits**
A "wide area" look into technology integration. An investigation into what the responsibilities of a technology coordinator will be — relating technology and thinking processes, the cognitive effects of technology integration, materials acquisition and placement and general administrative strategies.
Offered spring semesters of odd years.
Prerequisite: Ed 585 or equivalent.

Area VII — Science Education

EDUCATION 500. **Two credits**
INTEGRATED SCIENCE METHODS AND CURRICULA FOR K-12 TEACHERS
Section A - Early Childhood
Section B - Elementary School
C - Middle School
D - High School
Integrated Science Methods and Curricula for early childhood, elementary, middle school and high school teachers will prepare participants to infuse life, earth and space, and physical science activites into their own classrooms. Several innovative curricula will be included: Scholastic Science Place (grades K-2), Macmillan/McGraw Hill Science (Grades 3-6), Glencoe Science Interactions (Grades 7-9), BSCS Biology and Project Physics, other curricula appropriate for science content areas and grade levels, plus supplementary curricula such as AIMS, GEMS, and NatureScope. Various instructional methods proven effective by research or practice will be identified, described and modeled. Included will be hands-on activites, cooperative learning, thematic connections, constructivism, team teaching, role playing, peer teaching and others.

EDUCATION 501 **One Credit**

IMPLEMENTING SCIENCE METHODS AND CURRICULA, GRADES K-12

Section A - Early Childhood **Section C - Middle School**
Section B - Elementary School **Section D - High School**

Implementing Science Methods and Curricula for K-12 teachers will prepare participants to utilize life, earth and space, and physical science activities in their own classrooms and schools. Several innovative curricula will be included: Scholastic Science Place (grades K-2), Macmillan/McGraw Hill Science (Grades 3-6), Glencoe Science Interactions (Grades 7-9), BSCS Biology and Project Physics, other curricula appropriate for science content areas and grade levels, plus supplementary curricula such as AIMS, GEMS, and NatureScope. Various instructional methods proven effective by research or practice will be utilized. Included will be hands-on activities, cooperative learning, thematic connections, constructivism, team teaching, role playing, peer teaching and others. Participants will be expected to play a leadership role, providing curriculum implementation overviews and preparing, leading and supporting integrated science staff development programs in their own schools, and assessing the effectiveness of the implementation.

EDUCATION 502 **One Credit**

PROGRAM FOR ENHANCING EDUCATIONAL LEADERSHIP IN THE SCIENCES (PEELS)

Section A - Early Childhood **Section D - High School**
Section B - Elementary School **Section E - Principals**
Section C - Middle School

PEELS is designed to involve administrator/teacher teams in exemplary science experiences. Teams are instructed in science process skills, effective science teaching strategies, development of science program goals and the application of science education research to school science programs. Each team will design and implement an action plan which focuses on specific actions for the improvement of science in their own schools.

EDUCATION 503 **Two Credits**

SCIENCE AND MATHEMATICS ACTIVITIES AND METHODS

Section A - Early Childhood **Section C - Middle School**
Section B - Elementary School **Section D - High School**

Science and Mathematics Activities and Methods is designed to enable teachers to utilize hands-on laboratory experiences and effective instructional strategies to teach the content, processes and attitudes inherent in modern science and mathematics curricula and instruction.

EDUCATION 504 **Three Credits**

Career Orientation in Science and Technology (COST)

Section A - Early Childhood Section C - Middle School
Section B - Elementary School

COST is designed to involve early childhood, elementary or middle/junior high teachers in utilizing the skills of community resource people to demonstrate the need for science in many careers—including those not traditionally associated with science. The format of the course follows the COMETS (Career Orientated Modules to Explore Topics in Science) model. Teachers learn where to find science resource people and how to work with the resource person to present lessons in the classroom. Teachers will be responsible for implementing lessons with a resource person during the course.

EDUCATION 505 **Two Credits**

PROMOTING READING THROUGH INSTRUCTION IN SCIENCE & MATHEMATICS (PRISM)

Section A - Early Childhood Section C - Middle School
Section B - Elementary School Section D - High School

PRISM is designed to enable teachers to use hands-on science and mathematics activitites to foster improvement in language development through investigations in science and mathematics. Three or more basic elementary school curricular areas will be reinforced within the same time frame.

EDUCATION 506 **One Credit**

LOCAL SCIENCE CURRICULUM ENHANCEMENT (LCSE)

Section A - Early Childhood Section C - Middle School
Section B - Elementary School Section D - High School

The Local Science Curriculum Enhancement course is designed to instruct early childhood, elementary, middle school and high school teachers in curriculum selection, design and development at the local school level. Course participants will be involved in characteristic science lessons highlighting different types of science curricula available and will select/design lessons to add to their science program. Participants will observe and analyze numerous instructional techniques key to science instruction.

EDUCATION 507 **Two Credits**

A MATHEMATICAL ADVENTURE THROUGH SCIENCE EDUCATION (AMASE)

Section A - Early Childhood Section C - Middle School
Section B - Elementary School

The Mathematical Adventure through Science Education course will actively involve participants in hands-on investigations which exemplify the application of mathematics concepts, science process skills and positive attitudes. Problem solving, real-life applications, and tools of instructional technology will be utilized as models.

Area VIII — Advanced Courses

EDUCATION 560.

PSYCHOLOGY OF EXCEPTIONAL CHILDREN **Three credits**

Advanced study of children whose characteristics deviate significantly from normal children.

Section A Mentally Retarded
B Socially and Emotionally Maladjusted
C Gifted and Talented

EDUCATION 570. PROFESSIONAL AWARENESS FOR COOPERATING TEACHERS **Three credits**

This course is designed to identify the role of the cooperating teacher concerning the supervision of student teachers. The course presents a formal training program for cooperating teachers including strategies for the effective interaction with student teachers as well as crucial techniques of observation, supervision, and evaluation.

Prerequisite: Admission to this course approved through application to the Education Department.

EDUCATION 571. PRACTICUM IN SUPERVISION **Three credits**

Affords students an opportunity to gain experience in supervisory activities in education under the guidance of experienced supervisors.

EDUCATION 572. EXTENDED TEACHING **Three credits**
Students with appropriate teaching experience are assigned to a supervised teaching setting.
Prerequisite: Approval of department chairperson.

EDUCATION 573. CURRICULUM CONSTRUCTION **Three credits**
Advanced study of curriculum development and evaluation.

EDUCATION 576.
INTRODUCTION TO EDUCATIONAL ADMINISTRATION **Three credits**
Basic study of the administrative function in educational institutions.

EDUCATION 590. THESIS **Three credits**

EDUCATION 594. WORKSHOP **Three credits each semester**
Provides an opportunity for experienced teachers to develop study programs designed to meet their special needs. Students may receive credit more than once if there is no duplication in subject matter covered.

EDUCATION 595-596. INDEPENDENT STUDY **Three credits each semester**
Affords an opportunity for independent study of selected topics under faculty supervision.
Prerequisite: Permission of department chairperson.

EDUCATION 597. SEMINAR **Three credits**
An advanced course dealing with some significant issues selected by the instructor. The seminar technique provides a review of major problems based on the current level of knowledge in the area.
Prerequisite: Permission of the instructor.

EDUCATION 598. TOPICS **Three credits**
Advanced study of topics of special interest not extensively treated in regular courses.

EDUCATION 599. SHORT COURSES **One to three credits**
These courses treat a variety of topics, usually on a condensed schedule basis. Designed to investigate problems in the field, these courses provide an opportunity for practicing professionals to study current issues under qualified leadership. Departmental approval is required if credits are to be applied to meet degree requirements. A maximum of six credits may be used to meet degree requirements. Credit is given at the rate of one-half semester hour for each eight hours of classwork.

English

Patricia B. Heaman, Ph.D., *Chairperson*

Master of Science in Education

Special Degree Requirements

Candidates for the degree of Masters of Science in Education with a program in Secondary Education/English must complete eighteen hours of course work in English.

Information on requirements of the Education Department for the Master of Science Degree will be found under Education on page 35.

Courses of Instruction

ENGLISH 431. MEDIEVAL ENGLISH LITERATURE **Three credits**
A study of English literature to 1500, exclusive of Chaucer.

ENGLISH 432. TUDOR PROSE AND POETRY **Three credits**
Study of English non-dramatic literature, 1485-1603.

ENGLISH 433.
SEVENTEENTH CENTURY PROSE AND POETRY **Three credits**
A study of the non-dramatic literature of the period.

ENGLISH 434. EIGHTEENTH CENTURY PROSE AND POETRY **Three credits**
The chief poets and essayists of the eighteenth century. Includes Swift, Pope, and Johnson.

ENGLISH 435. ROMANTIC PROSE AND POETRY **Three credits**
Study of the chief poets and prose writers of the Romantic Period.

ENGLISH 436. VICTORIAN PROSE AND POETRY **Three credits**
Readings in the major writers of the Victorian Age.

ENGLISH 440. CHAUCER **Three credits**
Study of Chaucer's works, including *The Canterbury Tales* and *Troilus and Criseyde.*

ENGLISH 442. SHAKESPEARE **Three credits**
A study of selected plays; written reports on others not studied in class.

ENGLISH 444. MILTON **Three credits**
A study of Milton's poetry and major prose.

ENGLISH 450. THE ENGLISH NOVEL **Three credits**
A study of the tradition and major writers of the English novel in the eighteenth and nineteenth centuries. Works by Defoe, Richardson, Fielding, Austen, the Brontes, Dickens, Eliot, and Hardy, among others, as well as critical and theoretical works, may be included.

ENGLISH 452. AMERICAN NOVEL **Three credits**
A study of the American novel from its beginning to the present.

ENGLISH 455. MODERN NOVEL **Three credits**
Study of the major novels of the twentieth century.

ENGLISH 458. CONTEMPORARY FICTION **Three credits**
A study in fiction, including the novel, short story, and novella, written since World War II. Works from English, American and world literature may be included to reflect the diversity of contemporary literature and the emergence of post-modernist themes and forms.

ENGLISH 461. EARLY ENGLISH DRAMA **Three credits**
Study of the drama from the tenth century to 1642; reading of plays by pre-Elizabethan and Elizabethan dramatists exclusive of Shakespeare.

ENGLISH 463.
RESTORATION AND EIGHTEENTH CENTURY DRAMA **Three credits**
Study of the drama from 1600-1780.

ENGLISH 465. MODERN DRAMA **Three credits**
Study of important dramatists, European and American, from the time of Ibsen.

ENGLISH 466. AMERICAN DRAMA **Three credits**
A study of American drama from the colonial period to the present.

ENGLISH 470. MODERN BRITISH POETRY **Three credits**
Study of the major English and American novels of the twentieth century.

ENGLISH 476 . MODERN AMERICAN POETRY **Three credits**
Study of major movements and representative figures in modern American poetry.

ENGLISH 494. LITERARY CRITICISM **Three credits**
A study of literary theory and techniques of analysis.

ENGLISH 495-496. INDEPENDENT RESEARCH **Three credits each**
Independent study and research for advanced students in the field of the major under the direction of a staff member. A research paper at a level significantly beyond that of a term paper is required.
Prerequisite: Approval of department chairperson.

ENGLISH 497. SEMINAR **Three credits**
Presentations and discussions of selected topics.
Prerequisite: Approval of department chairperson.

ENGLISH 498. TOPICS **Three credits**
The study of a special topic in language, literature, or criticism. Possible topics include literature and science, Black literature, semiotics, children's literature, literature and film, literature and religion, etc..

History

Harold E. Cox, Ph.D. *Chairperson*

Master of Science in Education

Special Degree Requirements

Candidates for the degree of Master of Science in Education with a program in Secondary Education/History must take eighteen hours of history.

Information on requirements of the Education Department for the Master of Science in Education, major in history, will be found under Education on page 35.

Courses of Instruction

HISTORY 415.
READINGS IN ANCIENT HISTORY: THE NEAR EAST **Three credits**
Selected readings on the history of the Ancient Near East, with emphasis on primary sources. Conferences with instructor and paper.

HISTORY 416.
READINGS IN ANCIENT HISTORY: THE CLASSICAL WORLD **Three credits**
Selected readings on the history of Greece and Rome, with emphasis on primary sources. Conferences with instructor and paper.

HISTORY 421. AMERICAN SOCIAL HISTORY **Three credits**
This course entails a consideration of the development of American society from the colonial period until present times. Attention will focus especially on the rise of industrialism and its impact on society in the late nineteenth and twentieth centuries.

HISTORY 422. AMERICAN INTELLECTUAL HISTORY **Three credits**
This course is a survey of the formative ideas which seem most to have influenced American perceptions of the individual, society, and the drift of human affairs. The focus is upon the late 19th and early 20th centuries because this period is the time when seminal ideas were articulated in America.

HISTORY 424. AMERICAN ECONOMIC HISTORY **Three credits**
A survey of the evolution of the American economy from colonial dependency to modern industrial maturity. Emphasis will be placed upon the development of the United States as an industrial world power since about 1850.

HISTORY 425. AMERICAN ETHNIC HISTORY **Three credits**
A study of the institutions and problems that have characterized various immigrant, black, and Indian communities from colonial times to the present.

HISTORY 428.
HISTORY OF THE FOREIGN POLICY OF THE UNITED STATES **Three credits**
A selective treatment of major themes in American foreign policy from the founding of the Republic to the present.

HISTORY 431. COLONIAL AMERICA **Three credits**
Discovery, exploration and settlement; development of social, political, religious and intellectual institutions; independence and political reorganization.

HISTORY 432. THE NATIONAL PERIOD **Three credits**
A study of the political and economic history of the United States from 1783 to 1865. Special attention will be given to the evolution of sectional differences and the culmination of these differences in intersectional warfare.

HISTORY 433. THE AGE OF BIG BUSINESS, 1865-1914 **Three credits**
A study of the political and economic history of the United States from 1865 to 1914. Special attention will be paid to the period of congressional dominance and the restoration of presidential power at the turn of the century; the economic, social and political consequences of the industrial revolution; and the rise of urban America.

HISTORY 434. THE UNITED STATES, 1900-1945 **Three credits**
The emergence of the United States as a world power and the corresponding development of its political, economic, social, and religious institutions.

HISTORY 435. THE UNITED STATES SINCE 1945 **Three credits**
An examination of the political, social, and economic changes in the United states since World War II. Special attention is paid to America's dominant role in the immediate post-war world and how changing conditions over the past forty years have altered this role.

HISTORY 441-442. HISTORY OF GREAT BRITAIN AND THE BRITISH EMPIRE AND COMMONWEALTH **Three credits each semester**
A study of British history from the Neolithic period to present times. The first semester will cover social, economic, and political developments to 1783, including expansion overseas. The second semester will cover the consequences of the industrial revolution and the evolution of the empire into the Commonwealth.

HISTORY 445. EASTERN EUROPE I **Three credits**
A study of the cultural, political, and intellectual history of the Poles, Czechs, Slovaks, Croats, Slovenes and Hungarians, who occupy the northern tier of Eastern Europe. Special attention is given to the roles of the Habsburg and Russian empires in shaping the historical destinies of these peoples, and to the roots and consequences of the forces of nationalism in the region.

HISTORY 446. EASTERN EUROPE II **Three credits**
A study of the cultural, political and intellectual history of the Bulgarians, Serbs, Croats, Slovenes, Albanians, Greeks, Romanians and Turks, who occupy the southern, or Balkan, tier of Eastern Europe. Special attention is given to the roles of the Ottoman Turkish, Habsburg and Russian empires in shaping the historical destinies of these peoples, and to the roots and consequences in the region of such forces as Christian-Muslim cultural interrelationships and nationalism.

HISTORY 448. HISTORY OF RUSSIA **Three credits**
A study of the political, social, and intellectual history of Russia. Emphasis is placed upon the emergence of Russia as a major power after 1700.

HISTORY 451. READINGS IN MEDIEVAL EUROPE **Three credits**
Selected readings on the history of Medieval Europe, with emphasis on primary sources. Conferences with instructor and paper.

HISTORY 452. THE RENAISSANCE AND REFORMATION **Three credits**
Within the political and economic framework of the period, study will be made of the culture of the Renaissance, the religious reform and conflicts resulting from the crisis in the sixteenth century.

HISTORY 453. AGE OF ABSOLUTISM **Three credits**
The political, social, economic, intellectual, and cultural development of Europe and dependencies from 1600 to ca. 1750.

HISTORY 454.
THE ERA OF THE FRENCH REVOLUTION AND NAPOLEON **Three credits**
A study of the structure of the Ancien Regime and an examination of the causes, events, and consequences of the French R evolution culminating in the Napoleonic Empire.

HISTORY 455. EUROPE IN THE NINETEENTH CENTURY **Three credits**
A study of the political, social, and cultural development of Europe from the Congress of Vienna to World War I.

HISTORY 456. EUROPE IN THE TWENTIETH CENTURY **Three credits**
Against a background of the internal and international developments of the leading powers, the class will study the origins and results of the two World Wars.

HISTORY 461-462 HISTORY OF THE FAR EAST **Three credits each semester**
A study of the history of the civilizations developed in India, China and Japan with emphasis on their interrelations and distinctive characteristics and on their transformation in response to the penetration of western civilization from the sixteenth century onward. Some attention will be given to similar developments and changes among the countries of Southeast Asia. Fall semester: to c. 1760. Spring semester: 1760 to present.

HISTORY 463. HISTORY OF MODERN CHINA **Three credits**
A study of Chinese history since 1840 with special emphasis on social, political, economic, and intellectual developments.

HISTORY 464. DIPLOMATIC HISTORY OF THE FAR EAST **Three credits**
A study of the relationship of the states of the Far East with one another and the West in the nineteenth and twentieth centuries.

HISTORY 465. HISTORY OF CHINESE COMMUNISM **Three credits**
This course is designed to examine the origins of Chinese Communism,the rise of the Chinese Communist Party to national power, and the essential features of Mao Tse-tung's strategies and policies.

HISTORY 467. HISTORY OF MODERN INDIA **Three credits**
A study of the political, social, and economic development of the Indian sub-continent since 1500.

HISTORY 476. WORLD WAR II **Three credits**
Consideration of the causes of the war, military strategy and tactics, diplomatic interests of the participants, and resulting cold war problems.

HISTORY 491. HISTORIOGRAPHY AND RESEARCH **Three credits**
An introduction to historical research and writing. The writings and ideas of major historians of the past and present are examined. The student is exposed to research methods, particularly in the area of primary sources, and to the construction and criticism of the historical monograph.

HISTORY 495-496. INDEPENDENT RESEARCH **One to three credits**
Independent study and research for advanced students in the field of the major under the direction of a staff member. A research paper at a level significantly beyond a term paper is required.

HISTORY 497. SEMINAR **One to three credits**
Presentations and discussions of selected topics. (May be repeated for credit.)
Prerequisite: Approval of the instructor is required.

HISTORY 498. TOPICS **Three credits**
Special topics in history. This course will be offered from time to time when interest and demand justify it.

Nursing

Ann M. Kolanowski, M.S., Ph.D., *Chairperson*
Mary Ann Saueraker, D.Ed., R.N.,*Program Director*

Master of Science with Major in Nursing

The purposes of the graduate program in Nursing at Wilkes University include preparation of an advanced practitioner in nursing who can focus upon the complex needs of clients in a variety of settings and functional role development in nursing administration, education, or clinical practice. This program will provide a foundation for doctoral study in nursing and for continued professional development.

Implementing the philosophy of the Department of Nursing, the program is consistent with the mission of the University which includes service to Northeastern Pennsylvania. The first clinical focus is, therefore, upon advanced practice in gerontological nursing. Functional preparation may be selected from the areas of administration, education or clinical practice.

Multidisciplinary in approach, the program encourages individual choice based upon the personal interests and career goals of the students. Flexible scheduling of courses enhances the ability of students to complete program requirements while maintaining employment or in full-time study.

Admission Requirements

In addition to the requirements of the Graduate Division, admission to the graduate program in nursing requires:

1. Graduation from an approved baccalaureate program in nursing.
2. Licensure as a Registered Nurse.
3. One year of clinical experience.
4. An undergraduate statistics course.
5. An undergraduate research course.
6. Evidence of health assessment skills.
7. Scores on the Graduate Record Examinations (GRE) **or** the Miller Analogies Test.
8. A statement of professional goals. These goals should relate to the goals of the graduate program in nursing at Wilkes.

A student whose background is judged to be deficient in any area will be evaluated individually and a program plan which will remedy the deficiency will be developed. Courses to remedy such deficiency do not carry graduate credits.

For a personal interview to discuss program requirements and career goals, please arrange an appointment with the Program Director.

The Program Objectives

1. Synthesize advanced knowledge of nursing and related disciplines in the development of **advanced** nursing practice.
2. Develop clinical expertise with select populations reflective of demographic characteristics of a specific geographic area.
3. Develop skills and abilities to assume a leadership position in nursing administration, education, or clinical practice.
4. Evaluate nursing research for its applicability to advanced practice.
5. Evaluate applicable knowledge and concepts for nursing to deal with the complexities of a dynamic society.
6. Participate in life-long learning as a part of professional nursing practice.

The Curriculum
(36 Credits)

The Core (fifteen credits)

N501: Theoretical Foundations of Nursing — 3 credits
N502: Application of Nursing Research — 3 credits
N505: Current Perspectives in Nursing — 3 credits
HSA556: Quantitative and Applied Methods in Health Administration — 3 credits
(See course description on page 32)
N590: Scholarly Project — 3 credits

The Clinical Focus (twelve credits)

N406: Health Assessment of the Elderly — 3 credits
N511/HSA 561: Perspectives on Aging — 3 credits
N504: Advanced Role Development in Nursing — 3 credits
N506: Practicum for Application of a Model to Gerontological Nursing — 3 credits

The Functional Area (six credits)

Each student is required to complete one three-credit practicum plus one three-credit support course in his/her chosen area.

Administration of Nursing Service:
N513: Functional Practicum in Nursing Administration — 3 credits
Support course *or* — 3 credits

Education in Nursing:
N514: Functional Practicum in Nursing Education — 3 credits
Support course *or* — 3 credits

Clinical Practice:
N515: Functional Practicum in Gerontological Nursing — 3 credits
Support course — 3 credits

Elective Course (three credits) — 3 credits

In consultation with the advisor, the graduate student may choose any graduate course available in any program of the University

Courses of Instruction

NURSING 406. HEALTH ASSESSMENT OF THE ELDERLY **Three credits**
This course presents an overview of the health assessment of the older adult client. In most repects the physical assessment of the elderly is no different from the young adult. However, the greater incidence of disease and infimity in the older adult requires skill on the part of the examiner in separating pathologic process from aging process. Emphasis on multiple aspects of assessment including physical, functional and cognitive assessment along with transcultural variations will prepare the student for advanced practice in gerontological nursing.
Prerequisite: Graduate Standing or permission of Instructor.

NURSING 501. THEORETICAL FOUNDATIONS OF NURSING **Three credits**
This course emphasizes the systematic process of theory development in nursing. The role of traditional science in relation to other ways of knowing is explored. Students will describe, analyze, and evaluate current theories of nursing. The relationship of research and practice to theory is discussed.
Prerequisite: Graduate Standing.

NURSING 502. APPLICATION OF NURSING RESEARCH **Three credits**

This course builds on knowledge and skills developed in undergraduate research and statistics courses. Skills in the analysis and evaluation of nursing research are further developed. Students analyze the contributions of the empirical approach to the development of nursing science. Selected research designs and methodologies which are used to advance nursing knowledge are examined. Students are given the opportunity to critique and synthesize current research for its application to an identified problem in nursing practice.

Prerequisite: Undergraduate Statistics and HSA 556.

NURSING 504. **Three credits**
ADVANCED ROLE DEVELOPMENT IN NURSING

Examines the role development process and its applicability to the advanced practice role in gerontological nursing. The historical, theoretical, and conceptual bases of role development, advanced practice, and evaluation are explored. A framework for practice, which includes the sub-roles of practitioner, educator, researcher, manager and consultant, is examined.

NURSING 505. CURRENT PERSPECTIVES IN NURSING **Three credits**

Analysis of issues relative to advanced nursing practice. Assessment of proposed approaches to the resolution of issues, based on current literature and research findings, is done collaboratively in a seminar format.

Prerequisite: Graduate Standing.

NURSING 506. **Three credits**
APPLICATION OF A MODEL TO GERONTOLOGICAL NURSING

Students select a model of practice for application in the restoration, promotion, or maintenance of health in the older adult. Clinical experiences provide the opportunity to engage in advanced clinical practice. The seminar component of the course is designed to facilitate model application and to extend the theoretical and research base of advanced clinical practice.

Prerequisites: NSG 406, 501, 502 and 511 (May take NSG 504 concurrently).

NURSING 511/HSA 561. PERSPECTIVES ON AGING **Three credits**

Human development from adulthood through old age is analyzed from a multidisciplinary perspective. The interrelationship of physical, psychological, and social processes of aging is analyzed. Holistic assessment of aging, including the interaction between an aging society and the subsequent increase in chronic health problems as they impact on social resources and health care delivery, is emphasized.

Prerequisite: Graduate Standing.

NURSING 513. **Three credits**
FUNCTIONAL PRACTICUM IN NURSING ADMINISTRATION

The student, using organization theory and research findings, will analyze management and leadership strategies from the perspective of a nursing administratior who will serve as clinical facilitator and role model. The complexities of the nurse administrator role will be examined through active participation in selected role activities.

Prerequisite: NSG 506

NURSING 514. **Three credits**
FUNCTIONAL PRACTICUM IN NURSING EDUCATION

The student will participate in a faculty role within educational settings. Each student will be assigned to a master teacher who will assist them in the selection of learning experiences within the context of the faculty role. Educational theories and relevant research will be used to develop strategies for teaching in the classroom and clinical settings.

Prerequisite: NSG 506

NURSING 515 **Three credits**
CLINICAL PRACTICUM IN GERONTOLOGICAL NURSING

Building upon the content of the prerequisite courses and clinical practice of Nursing 506, this course is designed to synthesize nursing theory and research as a basis for the application of the advanced practitioner role. This role will be applied in a variety of clinical settings to implement and manage the nursing of the elderly.

Prerequisite: NSG 506

NURSING 590. SCHOLARLY PROJECT **Three credits**

The student, under the guidance of a selected faculty member, will critique and synthesize relevant research and literature on a concept or theory germane to nursing. The student will explore interrelationships between ideas in a scholarly manner. Implications for practice, education, or administration will be addressed. The student will defend his/her position in an oral examination.

Prerequisite: NSG 506 and consent of instructor.

NURSING 595-596. INDEPENDENT STUDY **One to Three credits**

Affords an opportunity for independent study of selected topics under faculty supervision.

Prerequisite: Permission of department chairperson or program director.

NURSING 598. TOPICS IN NURSING **Three credits**

Advanced study of topics of special interest not extensively treated in regular courses.

Prerequisite: Graduate Standing.

School of Science and Engineering

Umid R. Nejib,Ph.D., *Dean*
Bing K. Wong, Ph.D., *Associate Dean*

Administrative Heads

David A. Agee, (Lt. Col.)	Aerospace Studies
Ahmad Armand, (Ph.D.)	Electrical and Computer Engineering
Louise M. Berard, (Ph.D.)	Mathematics and Computer Science
Dale A. Bruns, (Ph.D.)	GeoEnvironmental Sciences and Engineering
Owen D. Faut, (Ph.D.)	Chemistry
Roger L. Maxwell, (Ph.D.)	Physics
John L. Orehotsky, (Ph.D.) (Acting)	Mechanical and Materials Engineering
Ralph B. Rozelle, (Ph.D.)	Dean, Health Sciences
Lester J. Turoczi, (Ph.D.)	Biology
To be announced	Dean, Pharmacy

School Graduate Committee

Thyagarajan Srinivasan, (Ph.D.)(chair)	Electrical and Computer Engineering
Yunsoo Choe, (Ph.D.)	Electrical and Computer Engineering
Wilbur F. Hayes, (Ph.D.)	Biology
Jerome Kucirka, (Ph.D.)	Physics
Vee Ming Lew, (Ph.D.)	Mathematics and Computer Science
William R. Stine, (Ph.D.)	Chemistry
To be announced	Pharmacy

The School of Science and Engineering offers the following graduate programs.

A. Master of Science in
   1. Electrical Engineering
   2. Mathematics
   3. Physics
B. Master of Science in Education with concentration in
   1. Biology
   2. Chemistry
   3. Mathematics
   4. Physics
C. A 5-Year B.S.-M.S. degree in Mathematics.
D. A 5-Year B.S. degree in Engineering Management/M.B.A.
E. Doctor of Philosophy in
   1. Electrical Engineering
   2. Physics

   in a cooperative program with University of West London, United Kingdom.
F. Doctor of Pharmacy (Pharm. D.) in start-up phase

Admission

The following requirements apply to all the degree programs listed above.

a. **Degree Track**

For admission to the graduate program, the applicant should submit the documents listed.

The requirements are:

1. Completed Graduate Application.

2. Official academic transcripts.
3. Up-to-date resume.
4. Two letters of recommendation.
5. A copy of the undergraduate degree, from an accredited institution, in the same field that the applicant is seeking admission. Degrees in related fields can qualify, subject to review and approval by the School Graduate Committee.

Foreign applicants should meet language, financial, and immigration requirements designated by the Graduate Affairs Division. Advanced standing or transfer credit requests, if applicable, should be made at the time of initial application. Graduate transfer credits are limited to 6.

b. **Non-Degree Track**

Applicants under this category will not be considered for a degree. However, they are allowed to enroll in graduate classes provided they satisfy the requirements listed and the prerequisites for the specific courses. Such students may elect to change their status to the degree track by satisfying the requirements listed above.

The requirements are:

1. Completed Graduate Application.
2. Official academic transcripts.
3. Up-to-date resume.
4. One letter of recommendation.

Individual programs may have specific requirements for admission. Refer to the appropriate program of interest.

c. **Pharmacy**

The start of the 1994 academic year signifies the implementation of the Pre-Pharmacy curriculum as the first step toward initiation of the Doctor of Pharmacy program at Wilkes. This initiative, leading to the Pharm. D. degree, is a 2 year pre-pharmacy program. It will prepare students to satisfy state licensure requirements and also to develop hands-on pharmaceutical skills and business savvy in order to function as 21st century pharmacists.

The curriculum aims to develop meaningful interpersonal, investigative, experimental, business, and computer skills through classroom instruction, the use of modern techniques, and in-depth clinical experience and clerkships (the hallmark of the program). Upon graduation, students can select pharmacy careers in such areas as drug store and patient-centered pharmacy practice, graduate education, or the pharmaceutical industry.

Pharmacy Minimum Admission Requirements
enrollment limit: 65

Applicant must:

1. Have completed the pre-pharmacy curriculum at Wilkes with a minimum GPA of 2.50 or at any accredited college or university in the USA with a minimum GPA of 2.75;
2. Provide two recommendations from pre-pharmacy faculty; and
3. Complete an interview.

Applicant has the option to:

1. Submit a pharmacist's recommendation and/or
2. Complete the Pharmacy College Admission Test (PCAT) as an added preference.

Biology

Lester J. Turoczi, Ph.D., *Chairperson*

Master of Science in Education

Admission

Rerer to the general admission requirements on page 54.

Degree Requirements

Candidates for the degree of Master of Science in Education with a concentration in Secondary Education / Biology must take eighteen hours of biology in courses numbered 400 or above. Chemistry 361 and 362 may be taken for credit toward the biology component with the prior approval of the Chairperson of the Biology Department.

Requirements for the education component of the Master of Science in Education with a major in biology, are listed under Education on page 35.

Courses of Instruction

BIO 404. LIFE OF THE VERTEBRATES **Three credits**

This course presents a view of chordate animals with particular emphasis on the natural history, evolution, and classification of these forms. Lecture, two hours a week; laboratory, three hours a week. Fee: $40.

Prerequisites: Biology 121-122, 255-226, or permission of instructor.

BIO 406. INVERTEBRATE BIOLOGY **Four credits**

A study of the major invertebrate phyla with respect to their taxonomy, evoloution, morphology, physiology and ecology. Lecture, three hours a week, laboratory, three hours a week. Laboratory fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 411. COMPARATIVE PHYSIOLOGY **Four credits**

Comparative physiology encompasses the study of organ functions and organ system functions in different animal groups. Emphasis will be on the systemic physiology of vertebrate animals. Lecture, three hours a week; laboratory, three hours a week. Fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 412. PARASITOLOGY **Four credits**

Parasitology is the study of organisms that live on or within other organisms and the relationship of these organisms to their hosts. This course deals with the common parasites that infect man and other animals. Lecture, three hours a week; laboratory, three hours a week. Fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 421. MAMMALIAN PHYSIOLOGY **Four credits**

This course examines the function of mammalian systems with regard to homeostasis, growth, and reproduction. Emphasis is on human physiology; however, other mammalian systems are discussed to demonstrate physiological adaptability to various environmental situations. Lecture, three hours; laboratory, three hours per week. Laboratory fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 423. FUNCTIONAL HISTOLOGY **Four credits**

This course emphasizes the microscopic examination of mammaliam tissues from morphological and physiological perspectives. Reference is made to organ embryogenesis to support the understanding of organ form and function. Tissue preparation for histological examination is demonstrated. Lecture, three hours; laboratory, three hours per week. Laboratory fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 424. MOLECULAR BIOLOGY **Three credits**

Molecular Biology is the study of the energetics, metabolism, and biochemical aspects of living systems. A general biochemical presentation will be provided with reference to proteins, carbohydrates, and lipids with extensive coverge of molecular genetics. Lecture, three hours a week.

Prerequisites: Biology 121-122, 225-226, Chemistry 231-232, or permission of instructor.

BIO 425. ELECTRON MICROSCOPY FOR LIFE SCIENCES **Three credits**

A comprehensive course in the basic principles and practice of scanning electron microscopy plus introductions to older and newer types of electron microscopy. Lectures and laboratories emphasize scanning electron microscopy techniques for students preparing their own biological specimens and recording their own electron micrographs. Lecture, two hours a week; laboratory, three hours a week. Laboratory fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of department chairperson.

BIO 426. IMMUNOLOGY AND IMMUNOCHEMISTRY **Four credits**

This course is concerned with the biologic mechanisms and chemistry of reactants and mediators associated with natural and acquired states of immunity, tissue and blood serum responses to infection and immunization, and related patho-physiologic alterations of hypersensitivity phenomena in vertebrate animals and man. A background in microbiology, physiology, and biochemistry is advisible. Lecture, three hours a week; laboratory three hours a week. Fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 427. BACTERIOLOGY **Four credits**

Biology 427 is a general introductory course covering the morpohlogy and growth of bacteria, sterilization, and applied use of bacteria. The laboratory work covers techniques of staining, culturing, and biochemical testing for identification of bacteria. Lecture, three hours per week; laboratory three hours per week. Laboratory fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 428. DEVELOPMENTAL BIOLOGY **Three credits**

A course dealing with principles of organismic development, gametogenesis, fertilization, cleavage, embryogenesis, differentiation, morphogenesis, regeneration. Laboratory work includes vertebrate embryology, microtechnique, and some experimentation. Lecture, two hours; laboratory, three hours a week. Laboratory fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 441. LIMNOLOGY **Three credits**

A study of the chemical, physical, and biological aspects of fresh water systems. Laboratory investigations will consist of in-depth analyses of local lakes and streams. Lecture, two hours a week; laboratory three hours a week. Fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 443. MARINE ECOLOGY **Three credits**

An examination of the biology of marine life within the context of modern ecological principles. The structure and physiology of marine organisms will be studied from the perspectives of adaptation to the ocean as habitat, biological productivity, and interspecific relationships. Emphasis will be placed on life in intertidal zones, estuaries, surface waters, and the deep sea. Two hours of lecture and three hours of laboratory per week. Fee: $45.

Prerequisites: Biology 121-122, EES 230, or permission of instructor.

BIO 444. ECOLOGY **Four credits**

Ecology examines contemporary ecological thinking as it pertains to the interrelationship of organisms and their environments. Interactions at the population and community levels are emphasized. Lecture, three hours a week; laboratory, three hours a week. Fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 445. GENETICS **Four credits**

Genetics will present treatment of genetics beyond the introductory level with particular emphasis on populational and molecular aspects of heredity. Topics will include plant and human genetics. Lecture, three hours a week; laboratory, three hours a week. Laboratory fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 446. ANIMAL BEHAVIOR **Four credits**

A course emphasizing behavior as the response of an organism to physical and social environmental change, and covering the processes that determine when changes in behavior occur and what form they will take. Laboratories, using living local fauna, will demonstrate principles discussed in lecture. Lecture, three hours; laboratory, three hours a week. Laboratory fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 448. EVOLUTION **Three credits**

Evolution is the study of living things with time. Theories relating to the origin of life, natural selection, and speciation as processes of organic evolution are emphasized. Lecture, three hours a week. Field trip fee: $20.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 461. PLANT FORM AND FUNCTION **Four credits**

An introduction to the morphology, anatomy, cytology, and physiology of plants, with emphasis on the vascular plants. Structural and functional aspects of plants will be interpreted in relation to each other and within ecological and evolutionary contexts. Lecture, three hours per week; laboratory, three hours per week. Laboratory fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 462. PLANT DIVERSITY **Four credits**

A comprehensive survey of bryophytes, vascular plants and plantlike organisms (fungi and algae) emphasizing their structure, reproductive biology, natural history, evolution, and importance to humans. Lecture, three hours per week; laboratory, three hours per week. Laboratory fee: $40.

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 466. FIELD BOTANY **Three credits**

This is a specialized summertime field course which emphasizes a taxonomic, phylogenetic, and ecological survey of higher plants indigenous to Northeastern Pennsylvania.

Prerequisites: Biology 121-122, or permission of instructor.

BIO 468. MEDICAL BOTANY **Three credits**

A specialized course that provides a scientifically-based overview of the ways that plants affect human health. Topics include cultural and historical perspectives of plants and medicine, plants that cause human ailments, plants that cure human ailments, and psychoactive plants. Lecture, two hours per day for five weeks.

Prerequisites: Biology 121-122, 225, CHM 232, or permission of instructor.

BIO 494. BIOLOGICAL FIELD STUDY **Three credits**

On-site study of biological problems or situations incorporating documentation and investigation techniques. May be repeated for credit when no duplication of experience results. One hour of lecture per week, plus field trip. Fee: Variable

Prerequisites: Biology 121-122, 225-226, or permission of instructor.

BIO 498. TOPICS **Three credits**

A study of topics of special interest not extensively treated in regularly offered courses.

Prerequisites: Biology 121-122. 225-226, or permission of instructor.

Chemistry

Owen D. Faut, Ph.D., *Chairperson*

Master of Science in Education

Admission

Refer to the general admission requirements on page 54.

The applicant should have a baccalaureate degree from an accredited institution, with a minimum of 35 semester credit hours in chemistry. In addition, a year of physics and a working knowledge of calculus and differential equations are required. Students deficient in any of these areas may, at the discretion of the chemistry faculty, be granted provisional admission.

Degree Requirements

General requirements for the Master of Science in Education with a program in Secondary Education/Chemistry are listed under Education on page 35. Specific chemistry requirements will be outlined by the student's advisor in the chemistry department.

Courses of Instruction

CHM 421. ADVANCED INORGANIC CHEMISTRY **Three credits**
Introduction to ligand field theory; chemistry of the first transition series, organometallic, and *pi* acceptor compounds; mechanisms of inorganic reactions. Class three hours a week.
Prerequisite: CHM 222 and 252.

CHM 423. **One credit**
ADVANCED INORGANIC CHEMISTRY LABORATORY
Synthesis of coordination and organometallic compounds, and spectroscopic characterization of the products using modern laboratory techniques. Fee $50
Prerequisite: CHM 232

CHM 461. BIOCHEMISTRY I **Three credits**
This course is a study of the physical and chemical properties of proteins, nucleic acids, fatty acids and carbohydrates emphasizing the relationship between the chemical structure and the biological function. The course includes the physical methods of biochemistry, enzyme kinetics, bioenergetics and nucleic acid transcription and translation.
Prerequisite: CHM 232.

CHM 462. BIOCHEMISTRY II **Three credits**
This course is a study of the catabolism and anabolism of carbohydrates, fatty acids and amino acids. The course emphasizes the regulation and integration of major metabolic pathways, including glycolysis, the Kreb's cycle, electron transport, gluconeogenesis, pentose phosphate, fatty acid metabolism and amino acid metabolism.
Prerequisite: CHM 232.

CHM 463. BIOCHEMISTRY LABORATORY **One credit**
Laboratory experiments which emphasize biochemical techniques used in isolation and characterization of macromolecules. Included in the course are various chromatographic techniques, electrophoresis, spectrophotometry and classic biochemical methods. Laboratory three hours a week. Pre-lab, one hour per week. Fee $50.
Prerequisite: CHM 461 or permission of instructor.

CHM 498. TOPICS **Three credits**
A study of topics of special interest not extensively treated in regularly offered courses.
Prerequisite: Permission of the instructor.

Electrical & Computer Engineering

Ahmad Armand, Ph.D., *Chairperson*

Master of Science in Electrical Engineering (MSEE)

Courses are available days, evenings and weekends. Weekend courses are held on Saturday and Sunday every third weekend, five weekends per trimester.

Admission

In addition to the general admission requirements on page 54, applicant should possess a B.S. degree in Electrical Engineering from an accredited institution. Applicants not meeting the requirements set by the School Committee on Graduate Studies may be provisionally admitted and will be required to take sufficient undergraduate courses to make up deficiencies. Applicants should provide acceptable scores in the GRE (General and Engineering) *or* evidence of competence to perform graduate-level work.

Degree Requirements

Thirty (30) credit hours are required for the M.S.E.E. degree. These include the following:

00 credits	EE 400
09 credits	EE 401 and any two of EE 410, EE 432, and EE 460
12 credits	All EE courses listed under Courses of Instruction; graduate level courses from other disciplines are accepted with the department's approval; a maximum of six credits of 300-level courses is allowed.
03 credits	500-level courses
06 credits	EE 590, research-oriented thesis

When a student has completed the 9-credit core requirement, he or she is eligible for CANDIDATE status.

All listed 500-level courses, and THESIS, can only be taken by students who have achieved CANDIDATE status, or by written permission of the instructor. Both full- and part-time students are limited to a maximum of 3 thesis credits in any single semester.

The minimum acceptable grade point average is 3.0. (See Retention Policy, page 12, for details.)

Advanced standing or transfer credit is limited to six (6) graduate credits. Petitions should be submitted to the School Graduate Committee and should document minimum competency defined as relevant graduate coursework at an accredited institution with an earned minimum grade of 3.0 (0-to-4 scale) or equivalent expertise.

A research-oriented thesis is compulsory. The student may select from posted research topics or proposed areas of interest of the faculty and submit a proposal of their thesis to the School Graduate Committee. Final decision of topic and advisor will be taken by the Committee in accordance with the School guidelines. Ordinarily, these topics will touch on one or more of the following areas: Communication, Navigational Systems; Computers, Digital Systems; Microelectronics; Microwaves and Antennas; Power, Control Systems; Software Engineering. Some of the highly specialized and state-of-the-art laboratories available for students include Communications, Thick-Film Processing, Microelectronics, Microwaves, Antennas, Machines and Controls, Digital Design.

The thesis shall be defended in an open forum. Three faculty members constitute a thesis committee. One of these will be from outside the Department, and the thesis advisor will serve as chair.

Financial Aid

A limited number of assistantships are available for full-time students. Applicants should possesss superior academic qualifications and provide good scores in the GRE (General and Engineering).

Doctor of Philosophy in Electrical Engineering (Ph.D.)

This is an articulated program between Wilkes University and the University of West London (Brunel University). Students will be enrolled at Wilkes where they will be pursuing their Ph. D. work. However, when the student attains the Ph.D. candidacy he or she will also be registered as an external Ph.D. student of Brunel. Upon completion of all the requirements, the Ph.D. degree will be awarded by Brunel.

Wilkes and Brunel requirements must be satisfied prior to awarding the degree. All students must present and defend their Ph.D. thesis at Wilkes and at Brunel.

Admission Requirement

An applicant should either possess an M.S. degree in Electrical Engineering from an accredited institution or be currently enrolled in the M.S. Electrical Engineering program and have completed twenty-four (24) credits of graduate work, excluding thesis.

Application Procedure

Applicants must provide:

1. Completed Graduate Application Form;
2. Official academic transcripts;
3. Up-to-date resume; and
4. Two letters of recommendation.

Admission Procedure

The Graduate Commitee will carefully screen the application and invite the prospective candidate for an interview with the Committee to further assess his/her ability and maturity to undertake doctoral level research.

Degree Requirements

A minimum of thirty (**30**) credits is required. They include nine (**9**) credits of advanced graduate and twenty-one (**21**) credits of thesis work (EE 690).

Candidacy Status

Students will be reviewed by the Committee after the successful completion of six (6) credits of course work. The review includes an assessment of the student's performance and a preliminary research proposal written by the student. The proposal shall also be presented to the department in an open forum. Successful proposals will then be subjected to evaluation and approval by Brunel. Upon approval, the student will be declared a CANDIDATE for the Ph.D. degree.

Research Work

The student can now proceed with research work maintaining a minimum of six (6) credits of thesis per year. Continual registration (excluding Summer term) is mandatory. He/she will be officially registered as an external Ph.D. student of Brunel, will be assigned a Brunel supervisor, and will be subject to its current regulations for external Ph.D. students. A three-person thesis committee will be established at Wilkes for each candidate. It will consist of two members of the department and one member from outside the department.

Thesis Presentation

When a student has completed a thesis, it will be presented to the Wilkes faculty in an open oral presentation and, if approved, will be sent to Brunel for examination, which will comply with Ph.D. regulations currently in force. The candidate will be expected to travel to Brunel in order to attend a *viva* examination. Policies for thesis format, number of copies, and submission of copies are similar to those of the M.S. thesis.

Special Cases

An applicant not possessing an M.S. Degree in Electrical Engineering but in a related discipline will be required to take OR challenge courses that the committee decides that he/she should take in order to be as proficient as an applicant with the M.S. degree in Electrical Engineering.

If a Ph.D. student wishes to withdraw from the program but wishes to complete an M.S. degree, he/she can do so by satisfying the regulations for an M.S. degree in place at that time.

Course Descriptions

Students will be advised of the course offerings, sequencing, and prerequisites upon admission. The faculty advisor will be in a position to recommend courses to the student taking into account the time-table and the necessary prerequisites.

The 500-level courses are restricted to students who have achieved candidate status or by written permission of the instructor. All 400-level courses require a background based on 300-level courses or the equivalent of the B.S. degree.

Courses of Instruction

EE 337. WAVEGUIDES AND ANTENNAS **Three credits**

Guided TE and TM waves; cavities and resonant circuits; strip line; S-parameters and microwave devices; directional coupler, attenuator, frequency meter; electromagnetic radiation; dipole antenna; antenna arrays. Two hours lecture and one three-hour laboratory a week. Fee $15.

Prerequisite: EE 336.

EE 342. MICROCOMPUTER OPERATION AND DESIGN **Three credits**

Microprocessor architecture, microcomputer design, and peripheral interfacing. Microprogramming, software systems, and representative applications. Associated laboratory experiments consider topics such as bus structure, programming, data conversion, interfacing, data acquisition, and computer control. Two hours lecture and one two-hour laboratory a week.Fee: $50. (same as CS 329)

Prerequisite: EE 341/CS 320.

EE 343. COMPUTER DATA STRUCTURES **Three credits**

A study of the use of a high-level language to implement complex data structures. These include lists, trees, graphs, networks, storage allocation, file structure and information storage and retrieval. Three hours lecture a week. Fee: $50. (see CS 227)

Prerequisite: EE 246.

EE 344. OPERATING SYSTEM PRINCIPLES **Three credits**

Analysis of the computer operating systems including Batch, Timesharing, and Realtime systems. Topics include sequential and concurrent processes, processor and storage management, resource protection, processor multiplexing, and handling of interrupts from peripheral devices. Three hours lecture a week. (see CS 326)

Prerequisite: EE 343/CS 227.

EE 346. COMPUTER ARCHITECTURE **Three credits**

A study of the design, organization, and architecture of computers, ranging from the microprocessors to the latest "supercomputers." (see CS 330)

Prerequisite: EE 242 or EE 342.

EE 361. COMMUNICATION SYSTEMS **Three credits**

Fundamental properties of signals. Principles and techniques of linear signal processing. Modulation and demodulation systems, including pulse. Sampling, channel capacity, and coding. Methods of multiplexing. Modulator and multiplexer design. Noise and its effects on communication. Three hours lecture a week.

Prerequisite: EE 214.

EE 400. ETHICS IN SCIENCE AND ENGINEERING **Zero credits**

Ethical problems of scientists and technologists with an emphasis on modern case histories. The responsibilities and protections of professional status and the role of professional societies. Acceptable behavior; insider and outsider views. (Same as Phy 400)

EE 401. ANALYSIS **Three credits**

The analysis of some physical and abstract problems using well developed mathematical techniques such as contour integration; integral transforms; matrices; Bessel; Legendre; or Laguerre polynomials; FFT's; difference equations; and numerical methods. (Same as Phys 401)

EE 410. LINEAR SYSTEM THEORY **Three credits**

Linear spaces and linear operators; input-output systems and state variables; linear dynamical equations and impulse response matrices; controllability, observability and their applications to minimal realizations; state feedback controllers and observers; multivariable systems. (same as PHY 410)

EE 414. FEEDBACK CONTROL SYSTEMS **Three credits**
A review of mathematical models for physical systems. Block diagram simplifications; sensitivity measure and performance of control systems; state space representations; stability analysis; the Routh Hurwitz criterion; the root locus method; Bode plots; and the Nyquist criteria; lead and lag compensator design; design with state space representations.
Prerequisite: EE 214.

EE 415. DIGITAL CONTROL SYSTEMS DESIGN **Three credits**
Review of design and compensation of control systems. State space analysis of continuous-time and discrete-time systems; discrete-time observations, control and feedback; digital regulators design; digital tracking systems design; controlling continuous-time systems.
Prerequisite: EE 414.

EE 416. ROBOT VISION **Three credits**
Image formation and image sensing; binary images; geometrical and topological properties; reflectance map; photometric stereo, shape, and shading; motion field and optical flow; extended Gaussian images; picking parts out of bin.
Prerequisite: First course in Robotics.

EE 418. CONTROLS AND KINEMATICS IN NAVIGATION **Three credits**
Theory of kinematics with application to terrestrial navigation using inertial instrumentation. Accelerometer, gyroscope, stable platform and inertial mechanizations. Space stable, local level and strapdown navigator configurations and error analysis. Integrated navigation using complementary and Kalman filter techniques.
Prerequisites: EE 318, EE 460.

EE 421. POWER SYSTEM ANALYSIS **Three credits**
Review of power generation schemes. Transmission line calculations and power system representation; network solution by matrix transformations; symmetrical components; symmetrical and unsymmetrical fault analysis of power systems; load flow analysis.
Prerequisite: EE 321.

EE 425. POWER ELECTRONICS **Three credits**
SCR characteristics; turn-on and turn-off mechanisms; SCR connections; power and switching devices, including UJT, triac and special devices; AC power control: full-wave control, half-wave control, and phase control; line-commutated converters and inverters; chopper circuits; applications.
Prerequisite: EE 252, EE 321.

EE 432. ELECTROMAGNETIC FIELDS AND WAVES **Three credits**
Maxwell's equations; energy and momentum in the electromagnetic field; plane, cylindrical, and spherical waves; boundary conditions; cylindrical waveguides; cavity resonators; scattering by a sphere and other geometries. (Same as Phys 432)
Prerequisite: EE 337/Phy 332.

EE 435. MICROSTRIP CIRCUIT DESIGN **Three credits**
A review of TEM mode transmission line theory. Static TEM parameters and design; discontinuities in microstrip and coupled microstrip lines; design examples of passive microstrip elements; narrowband and wideband microwave amplifiers.
Prerequisite: EE 335/EE337/Phy 332.

EE 436. ANTENNA THEORY AND DESIGN **Three credits**
Electromagnetic vector potentials; Green's functions; radiating systems; image theory; reciprocity; directional arrays; linear and broadboard antennas; moment method; aperture antennas; microstrip antennas, and antenna synthesis.
Prerequisite: EE 337.

EE 441. DIGITAL SYSTEMS DESIGN **Three credits**
Advanced topics in digital design; combinational and sequential circuit modeling, fault modeling, digital design testing and testability, design to test principles, and basic concepts in fault tolerant design.
Prerequisite: EE 341.

EE 451. OPTO-ELECTRONICS **Three credits**
Electromagnetic theory; propagation of rays; propagation of optical beams in homogeneous and guiding media; optical resonators; interaction of radiation and atomic systems; theory of laser oscillators; some specific laser systems; second-harmonic generation and parametric oscillation; electroptic modulation of lasers; optical radiation interaction of light and sound; propagation, modulation, and oscillation in optical dielectric waveguides; laser applications; fiber optics and couplers.
Prerequisite: EE 337/Phy 332, EE 401.

EE 460. STOCHASTIC PROCESSES IN ENGINEERING **Three credits**
Review of probability. Random variables and random processes; functions of one and two random variables; expectations; moments and characteristic functions; correlation and power spectra; stationary and nonstationary processes, harmonic analysis of random processes.
Prerequisite: EE 214.

EE 461. DIGITAL COMMUNICATIONS **Three credits**
Sampling theory; analog pulse modulation; time-division multiplexing; baseband digital transmission; bandlimited digital PAM systems; synchronization techniques; PCM, PCM with noise, DPCM and DM; digital multiplexing; error correction and detection; linear block codes; convolutional codes; bandpass digital transmission; coherent and noncoherent binary systems; quadrature carrier and M-ary systems; information theory.
Prerequisite: EE 361, EE 460.

EE 465. DIGITAL SIGNAL PROCESSING **Three credits**
Z transforms; Fourier transforms; discrete Fourier transforms; sampling theorem; analog filter approximations; digital filter realizations and topological properties; analysis and design of recursive (IIR) filters and non-recursive (FIR) filters; fast Fourier transforms.
Prerequisite: EE 214, EE 252.

EE 471. ADVANCED SOLID STATE DEVICES **Three credits**
Review of semiconductor fundamentals. Physics, fabrication technologies, and operational characteristics of a variety of solid-state structures including p-n junctions, bipolar transistors, thyristors, metal semiconductor contacts, JFET and MESFET, MIS and CCD, MOSFET, microwave and photonic devices including IMPATT, BARITT, TED, LED, semiconductor lasers, photodetectors, and solar cells.
Prerequisite: EE 272.

EE 474. INTEGRATED CIRCUIT DESIGN **Three credits**
Model calculations, transfer characteristics and use of SPICE for MOS devices and circuits; basic logical units; integrated systems fabrication including scaling, channel properties, yield statistics, design rules and choice of technology; data and control flow including clocks, registers and PLA'S; design implementation from circuit topology to patterning geometry and wafer fabrication; CAD; overview of LSI and VLSI systems; architecture and design of system controllers; system timing (SPICE); physical aspects of computational systems; ASICs memories and other logical circuits.
Prerequisite: EE 272, EE 341.

EE 481. ADVANCED MICROELECTRONICS LAB **Three credits**

Theoretical and practical aspects of techniques utilized in the fabrication of semiconductor devices. Techniques of wet chemistry; deposition and diffusion; advanced concepts of contamination control; defect-free processing and gettering; complete characterization including junction penetration, resistivity, and oxide thickness. Switching speed, junction characteristics, leakage and gain, ion implantation, and method of fabrication. Extensive use of process simulation programs such as SUPREM.

Prerequisite: EE 272.

EE 482. **Three credits**

ADVANCED COMMUNICATION AND ANTENNA LAB

Characterization and measurement of microwave devices and systems; emphasis on antenna design and testing; utilization of the network analyzer and spectrum analyzer; antenna pattern measurements; communication link design; computer-aided design of active and passive microwave circuits; touchstone, optical signal generation and modulation. Fee: $50.

Prerequisite: EE 335.

EE 498. TOPICS IN ELECTRICAL ENGINEERING **Three credits**

Selected topics in electrical engineering. These may include one or more of the following: control systems, information theory, signals and noise measurements, communication systems, navigational systems, network design and synthesis, solid state, quantum electronics, magnetic and non-linear circuits, digital and analog systems, computer systems, medical engineering, power systems and generation. May be repeated for credit.

EE 510. OPTIMAL FILTERING THEORY **Three credits**

Review of stochastic processes; stochastic integrals and differential equations; Wiener filtering; discrete Kalman filter; applications and additional topics on discrete Kalman filtering; continuous Kalman filter; discrete smoothing and prediction; additional topics on Kalman filtering.

Prerequisite: EE 410, EE 460.

EE 514. OPTIMAL CONTROL THEORY **Three credits**

The calculus of variations and the minimum principle; optimal control of discrete-time systems; optimal control of continuous-time systems; dynamic programming; models of dynamic systems; optimal estimation; stochastic neighboring optimal control. (Same as Phy 514)

Prerequisite: EE 410.

EE 516. ROBOTICS AND ARTIFICIAL INTELLIGENCE **Three credits**

Prospects for knowledge-based robots; robots and artificial intelligence; expert systems and knowledge-based languages; production-rule expert systems; search techniques; heuristic graph searching; AND/OR graphs; first order predicate logic; future prospects for knowledge-based robots.

Prerequisite: First course in Robotics.

EE 521. COMPUTER AIDED ANALYSIS OF POWER SYSTEMS **Three credits**

Bus impedance and bus admittance matrices; sparsity programming and triangular factrorization. Load-flow studies; Gauss, Gauss-Seidel, Newton-Raphson methods. Approximate, fast and special-purpose load-flow studies. Optimal dispatch: equal incremental cost rule; gradient dispatch; optimal reactive power dispatch methods.

Prerequisite: EE 421.

EE 535. MICROWAVE CIRCUITS **Three credits**

Microwave networks; S-parameters and stability considerations; characterization of transmission line structures and discontinuities; models of microwave solid state devices; measurement techniques for modeling; design synthesis; optimization and analysis of microwave integrated circuits; numerical methods.

Prerequisite: EE 435.

EE 541. MICROPROCESSOR-BASED SYSTEMS DESIGN **Three credits**

Brief review of directions in microprocessor development: single chip microcomputers, Reduced Instruction Set Computers (RISC's), and Multiple Data Stream processors; hardware and software aspects of the design of microprocessor based systems; architecture and design of multiple computer and parallel processing systems; cache memory techniques and issues; bus standards and interfacing.

Prerequisite: EE 342.

EE 560. DETECTION AND ESTIMATION THEORY **Three credits**

Probabilistic signal detection and parameter estimation theory. Decision criteria, performance, likelihood, Bayes and parameter estimation; random processes, detection and estimation of white and nonwhite Gaussian noise. Kalman and Wiener filters.

Prerequisite: EE 460.

EE 561. COMPUTER COMMUNICATION NETWORKS **Three credits**

Data/computer communication network structures; the structure and function of network protocols; data link control procedures; multiple-access protocols; wideband data transmission media; functions and characteristics of devices used in computer communications; analysis of data/computer networks.

Prerequisite: EE 461.

EE 562. OPTICAL COMMUNICATION **Three credits**

Structure and waveguiding fundamentals of optical fibers; signal degradation in optical fibers; optical sources and their characteristics; power launching and coupling; photodetectors; optical receiver operation; coherent and non-coherent detection; analysis and design of optical transmission links.

Prerequisite: EE 432, EE 461.

EE 565. DIGITAL IMAGE PROCESSING **Three credits**

Scenes, images and digital pictures; linear operations on pictures; discrete picture transforms; random variables and random fields; visual perception. Sampling using array of points and orthonormal functions; quantization; Karhunen-Loeve, Fourier, Hadamard, and cosine compression; predictive block truncation, error-free compression; rate-distortion function. Enhancement: gray scale modification, sharpening and smoothing; restoration: inverse least-squares and recursive filtering, constrained deconvolution.

Prerequisite: EE 401, EE 460.

EE 568. MODERN NAVIGATION SYSTEMS **Three credits**

Overview of electronic navigationsystems: Global Positioning Systems (GPS); application and status; concept and operation; accuracy and propagation consideration; GPS receiver; signal structure, integration principles for navigation systems; Kalman filtering; differential GPS.

Prerequisites: EE 418, EE 460.

EE 571. MODERN SOLID STATE DEVICES AND DESIGN **Three credits**

Semiconductor fundamentals at an advanced level. Silicon and GaAs, MOS devices; processing details; performance limitations; process design for given device specifications; limitations due to fabrication techniques; quantum phenomena in a variety of modern high performance devices; microwave semiconductor devices; integrated circuit design; VLSI design; computer aids for process and circuit design.

Prerequisite: EE 471.

EE 590. M.S. THESIS **One to Three credits**

EE 598.
ADVANCED TOPICS IN ELECTRICAL ENGINEERING **Three credits**
Advanced topics in electrical engineering. These may include one or more of the following: control systems: navigational systems; information theory; signals and noise measurements; communication systems; network design and synthesis; solid state; quantum electronics; magnetic and non-linear circuits; digital and analog systems; computer systems; medical engineering; power systems and generation. May be repeated for credit.

EE 690. Ph.D. THESIS **Three credits**

5-Year B.S. degree in Engineering Management/M.B.A.

This program is designed for students who wish to attain a B.S. and an M.B.A. degree at Wilkes in five years. An Engineering Management major may apply for admission to this program during the eighth semester. However, final admission will be based upon successful completion of the B.S. degree in Engineering Management.

Mathematics

Louise M. Berard, Ph.D, *Chairperson*

Master of Science
Master of Science in Education

The Courses of Study Are Intended for:

1. Those with an undergraduate degree in a traditional mathematics major who wish to make the transition to applied mathematics/computer science. For the degree in mathematics, a student who has met admission requirements can take up to half of the required thirty credits in computer science.
2. Current or prospective teachers of mathematics who wish to enhance their training in either educational methodology or in mathematics/computer science itself.
3. Those who plan to continue their studies beyond the master's level in either mathematics or computer science.

Admission

General admission requirements are described on page 9.

1. Master of Science in Mathematics
   Admission requirements for the School of Science and Engineering are described on page 54. In addition, applicants are expected to have had undergraduate courses in each of the following three areas; linear algebra or matrix theory, advanced calculus or real variables and abstract algebra. Students deficient in one or more of these areas may still be admitted into the program, but are required to make up for all undergraduate deficiencies early in their graduate studies.

2. Master of Science in Education
   Admission requirements for the Department of Education are described on page 35.

Degree Requirements

General degree requirements are described on page 11.

1. Master of Science in Mathematics
   Thirty credits of courses offered by the Department of Mathematics/Computer Science are required.These include the following:

6 credits	two ADVANCED courses (any course listed as 500 or above)
24 credits	eight BACKGROUND courses (any course listed as 300 or above, with at least twelve credits in courses listed as 400 or above)

   In addition, there is a thesis option available whereby students can work independently toward the completion of a written thesis under the direction of their faculty advisor. As many as six of the required twenty-four credits in BACKGROUND courses may be earned through thesis work. Students electing this option must also satisfy all general thesis requirements as described on pages 11 and 14.

2. Master of Science in Education
   The Department of Education degree requirements are described on page 35. Of the required thirty credits, eighteen must be in courses offered by the Department of Mathematics/Computer Science. For these, any course numbered 300 or above can be used, with at least three credits in courses numbered 400 or above.

Special Features of the Program

The department makes every effort to make the programs available to part-time as well as full-time students. Required courses are frequently offered in the early mornings and in the evenings, as well as during the summer months.

Financial Aid

A limited number of assistantships are available for full-time students.

Courses of Instruction

MTH 311. REAL ANALYSIS **Three credits**
A rigorous study of the topology of the real line, limits, continuity, differentiation, integration, and series of functions.
Offered every spring semester.

MTH 331. ABSTRACT ALGEBRA I **Three credits**
A study of elementary number theory, groups, rings, and fields.
Offered every fall semester.

MTH 343. GEOMETRY **Three credits**
A study of selected topics from Euclidean and non-Euclidean geometry.
Offered in the fall semester of even years.

MTH 351-352. PROBABILITY AND MATHEMATICAL STATISTICS I AND II **Three credits each**

Random variables, probability distributions, expectation and limit theorems, estimation, testing statistical hypotheses, confidence intervals.

351 is offered every fall;
352 is offered in the spring semester of odd years.

MTH 354. STATISTICAL METHODOLOGY **Three credits**

This course emphasizes applications, using statistical computer packages (SPSS or BMDP) and real data sets from a variety of fields. Topics include estimation and testing; stepwise regression; analysis of variance and covariance; design of experiments; contingency tables; and multivariate techniques,including the log-linear model.

Prerequisite: Mth 351 or consent of instructor.
Offered in the spring semester of even years.

MTH 360. LINEAR PROGRAMMING **Three credits**

Graphical linear programming, simplex algorithm and sensitivity analysis. Special L.P. models such as the transportation problem, transshipment problem, and assignment problem. May include integer programming, branch and bound algorithm, geometric programming, goal programming. (Same as CS 360)

Prerequisite: Programming experience in a high-level language.
Offered in the fall semester of odd years.

MTH 361-362. APPLIED MATHEMATICS I&II **Three credits each**

Mathematics of physical science and engineering. Topics include: vector, integral, and differential calculus, power series, partial differential equations, Fourier analysis, and eigenvalue problems.

Prerequisite: A course in differential equations.
361 is offered every fall;
362 is offered every spring.

MTH 363. OPERATIONS RESEARCH **Three credits**

A survey of operations research topics such as decision analysis, inventory models, queueing models, dynamic programming, network models, heuristic models, and non-linear programming. (Same as CS 363)

Prerequisite: Programming experience in a high-level language.
Offered every spring.

MTH 413. FUNCTIONS OF SEVERAL VARIABLES **Three credits**

A modern treatment of calculus of functions of several real variables. Topics include: Euclidean spaces, differentiation, integration and manifolds leading to the classical theorems of Green and Stokes.

Prerequisites: Mth 311 and a course in linear algebra.
Offered when demand warrants.

MTH 414. COMPLEX ANALYSIS **Three credits**

Complex functions, limit, continuity, analytic functions, power series, contour integration, Laurent expansion, singularities and residues.

Offered in the fall semester of even years.

MTH 432. ABSTRACT ALGEBRA II **Three credits**

A continuation of Mathematics 331. Polynomial rings, ideals, field extensions and Galois Theory.

Prerequisite: Mth 331.
Offered when demand warrants.

MTH 442. TOPOLOGY **Three credits**

Metric spaces, topological spaces, countability and separation axioms, compactness, connectedness, product spaces.

Prerequisite: Mth 311 or consent of instructor.
Offered when demand warrants.

MTH 464. NUMERICAL ANALYSIS **Three credits**

Numerical methods of differentiation, integration, solution to equations and of differential equations with emphasis on problems that lend themselves to solution on computers.

Prerequisites: A course in differential equations and programming experience in a high-level language.
Offered in the spring semester of odd years.

MTH 470. READINGS IN MATHEMATICS **Three credits**

Individual study of special topics under the supervision of a faculty member. Designed for students who have completed a substantial amount of course work in mathematics.

Prerequisite: Consent of department chairperson.
May be repeated for credit.

MTH 511. MEASURE AND INTEGRATION **Three credits**

Measures, measurable functions, integration, convergence theorems, product measures, signed measures.

Prerequisite: Mth 442, or consent of instructor.
Offered when demand warrants.

MTH 513. FUNCTIONAL ANALYSIS **Three credits**

Topics include: Banach spaces, Lp-spaces, Hilbert spaces, topological vector spaces, and Banach algebras.

Prerequisites: Mth 311 and a course in linear algebra.
Offered when demand warrants.

MTH 532. MODERN ALGEBRA **Three credits**

A study of group theory (including the Sylow Theorems and solvable groups); ring theory (including the Noetherian rings and UFDs); modules, tensor algebra, and semi-simple rings.

Prerequisites: Mth 331 and a course in linear algebra or consent of instructor.
Offered when demand warrants.

MTH 542. ALGEBRAIC TOPOLOGY **Three credits**

Polyhedra, simplicial homology theory, cohomology rings, and homotopy groups.

Prerequisite: Mth 442.
Offered when demand warrants.

MTH 398/498/598. TOPICS IN MATHEMATICS **Variable credit**

A wide range of topics in pure and applied mathematics may be offered upon demand.

Prerequisite: Consent of instructor.
May be repeated for credit.

MTH 590. THESIS **Variable credit**

Prerequisite: Consent of department chairperson.
May be repeated for credit.

THE FOLLOWING COMPUTER SCIENCE COURSES MAY BE TAKEN AS PART OF THE MASTER'S DEGREE IN MATHEMATICS OR MATHEMATICS EDUCATION.

CS 319. PRINCIPLES OF PROGRAMMING LANGUAGES **Three credits**

A study of the principles that govern the design and implementation of programming languages. Topics include language structure, data types, and control structures. Programming projects will familiarize students with the features of several specific langauges, such as Ada, LISP, and PROLOG.

Prerequisite: Computer Data Structures.
Offered in the spring semester of even years.

CS 320. DIGITAL DESIGN **Three credits**

Boolean Algebra; Application Specific Integrated Circuit (ASIC) digital logic functions, such as AND, OR, INVERT; digital storage devices; combinational logic; minimization techniques; synchronous and asynchronous design; delay and analysis; state machines; ASIC's. Two hours lecture a week and one two-hour lab a week. Fee: $50. (same as EE 341)

CS 321. SIMULATION AND DATA ANALYSIS **Three credits**

Methods of handling large data bases including statistical analysis and computer simulations. The emphasis will be upon discrete simulation models with a discussion of relevant computer languages, SLAM, GPSS, and/or SIMSCRIPT.

Offered in the fall semester of odd years.

CS 323. THEORY OF COMPUTATION **Three credits**

This course formalizes many topics encountered in previous computing courses. Topics include: languages, grammars, finite automata, regular expressions and grammars, context-free languages, push-down automata, Turing machines and computability.

Prerequisite: Knowledge of computer data structures.
Offered in the fall semester of even years.

CS 324. SYSTEMS ANALYSIS **Three credits**

A study of the design and implementation of large computer projects. Special emphasis is placed on applications to business systems. Students will use a CASE tool for automated systems analysis and design.

Prerequisite: File management experience in COBOL.
Offered every fall.

CS 325. DATABASE MANAGEMENT **Three credits**

Practical experience in solving a large-scale computer problem including determination of data requirements, appropriate data organization, data manipulation procedures, implementation, testing and documentation.

Prerequisite: CS 324.
Offered every spring.

CS 326. OPERATING SYSTEM PRINCIPLES **Three credits**

Analysis of the computer operating systems including Batch, Timesharing, and Realtime systems. Topics include sequential and concurrent processes, processor and storage management, resource protection, processor multiplexing, and handling of interrupts from peripheral devices. (same as EE 344).

Prerequisite: Computer Data Structures.
Offered in the fall semester of odd years.

CS 327. COMPILER DESIGN **Three credits**

A study of compiler design including language definition, syntactic analysis, lexical analysis, storage allocation, error detection and recovery, code generation and optimization problems.

Prerequisite: Computer Data Structures.
Offered in the spring semester of odd years.

CS 328. ALGORITHMS **Three credits**

Theoretical analysis of various algorithms. Topics are chosen from sorting, searching, selection, matrix multiplication and multiplication of real numbers, and various combinational algorithms.

Prerequisite: Computer Data Structures.
Offered in the fall semester of odd years.

CS 329. MICROCOMPUTER OPERATION AND DESIGN **Three credits**

Microprocessor architecture, microcomputer design, and peripheral interfacing. Microprogramming, software systems, and representative applications. Associated laboratory experiments consider topics such as bus structure, programming, data conversion, interfacing, data acquisition, and computer control. Two hours lecture and one two-hour laboratory per week. Fee: $50. (see EE 342)

Prerequisite: CS 320/EE 341.
Offered every spring.

CS 330. COMPUTER ARCHITECTURE **Three credits**

A study of the design, organization, and structure of computers, ranging from the microprocessors to the latest "supercomputers." (same as EE 346)

Prerequisite: CS 329/EE 342, or a course in assembly language.
Offered in the spring semester of odd years.

CS 335. ADVANCED DATABASE CONCEPTS **Three credits**

A continuation of CS 325. Concentration on the design of a large scale database system, current special hardware and software, and the role of a DBMS in an organization.

Prerequisite: CS 325.
Offered in the fall semester of even years.

CS 340. ARTIFICIAL INTELLIGENCE **Three credits**

This course will provide an overview of artificial intelligence (AI) application areas and hands-on experience with some common AI computational tools. Topics include search, natural language processing, theorem proving, planning, machine learning, robotics, vision, knowledge-based systems (expert systems), and neural networks. (same as EE 317)

Prerequisite: Knowledge of computer data structures.
Offered in the spring semester of even years.

CS 350. OBJECT-ORIENTED PROGRAMMING **Three credits**

The course serves as a practical introduction to the object-oriented programming paradigm. Fundamental concepts of object-oriented programming will be covered; these include objects, classes, inheritance, polymorphism, and data abstraction. Attention will be focussed on program development; among the specific languages to be covered are Smalltalk and C++. Object-oriented databases will also be discussed.

Prerequisites: Knowledge of computer data structures.
Offered in the fall semester of even years.

CS 355. COMPUTER NETWORKS **Three credits**

This course introduces basic concepts, architecture, and widely used protocals of computer networks. Topics include the Open System Interconnection (OSI) model consisting of physical link layer, data layer, network layer, transport layer, session layer, presentation layer, and application layer, medium access sublayer and LAN; various routing protocols; Transmission Control Protocol (TCP) and Internet Protocol (IP) for internetworking. (same as EE 347)

Prerequisite: Knowledge of computer data structures.
Offered in the spring semester of even years.

CS 360. LINEAR PROGRAMMING **Three credits**
Graphical linear programing, simplex algorithm and sensitivity analysis. Special L.P. models such as the transportation problem, transshipment problem, and assignment problem. May include integer programming, branch and bound algorithm, geometric programming, goal programming. (same as Mth 360)

Prequisite: Programming experience in a high-level language.
Offered in the fall semester of odd years.

CS 363. OPERATIONS RESEARCH **Three credits**
A survey of operations research topics such as decision analysis, inventory models, queueing models, dynamic programming, network models, heuristic models, and non-linear programming. (same as Mth 363)

Prerequisite: Programming experience in a high-level language.
Offered every spring.

CS 364. NUMERICAL ANALYSIS **Three credits**
Numerical methods of differentiation, integration, solution of equations and of differential equations with emphasis on problems that lend themselves to solution using computers. (same as Mth 464)

Prerequisites: A course in differential equations and programming expereince in a high-level language.
Offered in the spring semester of odd years.

CS 367. COMPUTER GRAPHICS **Three credits**
Introduction to equipment and techniques used to generate graphical representations by computer. Discussion of the mathematical techniques necessary to draw objects in two and three-dimensional space. Emphasis on application programming and the use of a high-resolution color raster display.

Prerequisite: Computer Data Structures.
Offered in the fall semester of even years.

CS 395-396. INDEPENDENT STUDY IN COMPUTER SCIENCE Three credits
Individual study in a chosen area of computer science under the supervision of a faculty member.

Prerequisite: Approval of department chairperson.
May be repeated for credit.

CS 398. TOPICS IN COMPUTER SCIENCE **Variable credit**
Study of one or more special topics in computer science.

Prerequisite: Consent of instructor.
May be repeated for credit.

Five-Year B.S.-M.S. Degree — Mathematics Major

This program is designed for those who wish to attain a B.S. and an M.S. degree with a major in Mathematics at Wilkes and will enable them to complete all requirements for both degrees in at most five years. A mathematics major may apply for admission into this combined program during the sixth or the seventh term if he or she has a minimum average of 3.00 in all mathematics courses numbered above 300 and an overall average of 2.60 at the time of application. A form for this purpose is available from the department chairperson.

All requirements for both degrees must be met. In addition, Mth 511 and 532 are required. No credit shall be counted in both degree programs. Scheduling will be done so that the student will be eligible to receive a B.S. degree at the end of four years.

Physics

Roger L. Maxwell, Ph.D., *Chairperson*

Master of Science in Physics

Admission

Refer to the general admission requirements listed on page 54. The applicant should possess a minimum of 24 hours of undergraduate credits in physics and produce acceptable GRE, General and Physics, scores or evidence of competence to perform graduate level work.

Students entering into the M.S. program in physics may be assumed to have differing backgrounds and interests. All degree-track students, however, must complete the CORE which consists of three courses: Physics 401 (Analysis), Physics 432 (Electromagnetism) and Physics 452 (Quantum Mechanics). Accordingly, entering degree-track students must have sufficient background to enroll in at least two of these courses.

Degree Requirements

Thirty (30) credit hours are required for the M.S. in Physics degree. These include the following:

00 credits	Phy 400
18 credits	six BACKGROUND courses, at least three (3) of which must be designated CORE courses, including Phy 401
06 credits	two ADVANCED graduate courses (listed 500-level courses)
06 credits	A research-oriented THESIS, Phy 590

When a student has completed the 9-credit core requirement, he or she is eligible for CANDIDATE status.

All listed 500-level courses, and THESIS, can only be taken by students who have achieved CANDIDATE status, or by written permission of the instructor. Both full-and part-time students are limited to a maximum of 3 thesis credits in any single term.

The minimum acceptable grade point average is 3.0 with not more than two grades below a 3.0. (See Retention Policy, page 12, for details.)

Advanced standing or transfer credit is limited to six (6) graduate credits. Petitions should be submitted to the School Graduate Committee and should document minimum competency defined as relevant graduate coursework at an accredited institution with an earned minimum grade of 3.0 (0-4 scale) or equivalent expertise.

A research-oriented thesis is compulsory. The student may select from posted research topics or proposed areas of interest of the faculty and submit a proposal for their thesis to the School Graduate Committee. Final decision of topic and advisor will be taken by the Committee in accordance with the School guidelines. The thesis shall be defended in an open forum. Three faculty members constitute a thesis committee. One of these will be from outside the Department, and the thesis advisor will serve as chair.

Financial Aid

A limited number of assistantships are available for full-time students. Applicants should possess superior academic qualifications and provide good scores in the GRE (General and Physics).

Doctor of Philosophy in Physics (Ph.D.)

This is an articulated program between Wilkes University and the University of West London (Brunel University). Students will be enrolled at Wilkes where they will be pursuing their Ph. D. work. However, when the student attains the Ph.D. candidacy he or she will also be registered as an external Ph.D. student of Brunel. Upon completion of all the requirements, the Ph.D. degree will be awarded by Brunel.

Wilkes and Brunel requirements must be satisfied prior to awarding the degree. All students must present and defend their thesis at Wilkes and at Brunel.

Admission Requirement

An applicant should either possess an M.S. degree in Physics from an accredited institution or be enrolled currently in the M.S. Physics program and have completed at least twenty-four (24) credits of graduate work, excluding thesis.

Application Procedure

Applicants must provide:

1. Completed Graduate Application Form;
2. Official academic transcripts;
3. Up-to-date resume; and
4. Two letters of recommendation.

Admission Procedure

The Graduate Commitee will carefully screen the application and invite the prospective candidate for an interview with the Committee to further assess his/her ability and maturity to undertake doctoral level research.

Degree Requirements

A minimum of thirty (**30**) credits is required. They include nine (**9**) credits of advanced graduate and twenty-one (**21**) credits of Ph.D. thesis work (PHY 690).

Candidacy Status

Students will be reviewed by the Committee after the successful completion of six (6) credits of course work. The review includes an assessment of the student's performance and a preliminary research proposal written by the student. The proposal shall also be presented to the department in an open forum. Successful proposals will then be subjected to evaluation and approval by Brunel. Upon approval, the student will be declared a CANDIDATE for the Ph.D. degree.

Research Work

The student can now proceed with research work maintaining a minimum of six (6) credits of thesis per year. Continual registration (excluding Summer term) is mandatory. He/she will be officially registered as an external Ph.D. student of Brunel, will be assigned a Brunel supervisor, and will be subject to its current regulations for external Ph.D. students. A three-person thesis committee will be established at Wilkes for each candidate. It will consist of two members of the department and one member from outside the department.

Thesis Presentation

When a student has completed a thesis, it will be presented to the Wilkes faculty in an open oral presentation and, if approved, will be sent to Brunel for examination, which will comply with Ph.D. regulations currently in force. The candidate will be expected to travel to Brunel in order to attend a *viva* examination. Policies for thesis format, number of copies, and submission of copies are similar to those for the M.S. thesis.

Special Cases

An applicant not possessing an M.S. Degree in Physics but in a related discipline will be required to take OR challenge courses that the committee decides that he/she should take in order to be as proficient as an applicant with the M.S. degree in Physics.

If a Ph.D. student wishes to withdraw from the program but wishes to complete an M.S. degree, he/she can do so by satisfying the regulations for an M.S. degree in place at that time.

Course Descriptions

Students will be advised of the course offerings, sequencing, and prerequisites upon admission. The faculty advisor will be in a position to recommend courses to the student taking into account the time-table and the necessary prerequisites.

The 500-level courses are restricted to students who have achieved candidate status or by written permission of the instructor. All 400-level courses require a background based on 300-level courses or the equivalent of the B.S. degree.

Courses of Instruction

PHY 400. ETHICS IN SCIENCE AND ENGINEERING **Zero credits**

Ethical problems of scientists and technologists with an emphasis on modern case histories. The responsibilities and protections of professional status and the role of professional societies. Acceptable behavior; insider and outsider views. (Same as EE 400)

PHY 401. ANALYSIS **Three credits**

The analysis of some physical and abstract problems using well-developed mathematical techniques such as contour integration, integral transforms, matrices, Bessel, Legendre, or Laguerre polynomials, FFT's difference equations and numerical methods. (Same as EE 401)

PHY 410. LINEAR SYSTEM THEORY **Three credits**

Linear spaces and linear operators; input-output systems and state variables; linear dynamical equations and impulse response matrices; controllability, observability and their applications to minimal realizations; state feedback controllers and observers; multivariable systems. (Same as EE 410)

Prerequisite: EE 214.

PHY 411. ANALYTICAL MECHANICS **Three credits**
Variational principles and Hamiltonian theory. Cannonical transformations and Gauge invariance. Descriptions of rigid body motions or other applications.

PHY 425. ENERGY SYSTEMS **Three credits**
The analysis of the conversion and transfer of energy in various systems of technical or scientific interest. High and low power density systems. Up and down scaling. Heat transfer and storage. Entropy considerations.

PHY 427. SOLID STATE DEVICES **Three credits**
Transistor processes and types. Properties of semiconductors and junctions. High current effects and low frequency feedback effects. Low and high frequency hybrid parameters.

PHY 432. ELECTROMAGNETIC FIELDS AND WAVES **Three credits**
Maxwell's equations. Energy and momentum in the electromagnetic field. Plane, cylindrical, and spherical waves. Boundary conditions. Cylindrical waveguides, cavity resonators and scattering by a sphere and other geometries. (Same as EE 432.)

PHY 435. LASER AND DEVICE OPTICS **Three credits**
Gaussian beam optics. Non-linear optical effects; frequency doubling; lasing. Wave guiding in the double heterostructure diode laser. IR and visible diode lasers. Spectral control. Comparison of gain-guided and real refractive index lasers. Construction details and the dynamics response of pulsed lasers.

PHY 436. OPTICAL IMAGE PROCESSING **Three credits**
Advanced topics on optical systems and their design, Fourier analysis in one and two-dimensional systems, scalar diffraction theory, Fresnel and Fraunhofer diffraction, optical thin films, image evaluation, frequency analysis of optical imaging systems, spatial filtering and optical information processing.
Prerequisite: EE 214 or PHY 301.

PHY 452. QUANTUM MECHANICS **Three credits**
Review of the important concepts and tools of quantum mechanics. Dirac notation, linear operators and unitarity. The Postulates. Bound and unbound states, unstable states. Gauge invariance. The harmonic oscillator and phonons. The central potential and hydrogen-like systems. Applications.

PHY 480. NUCLEAR AND HIGH ENERGY PHYSICS **Three credits**
Nuclear size and shapes. Radioactive decay. Alpha and Gamma emission. The Fermi theory of Beta decay. Nuclear reactions and subnuclear particles. Classification. Two nucleon interactions. Collective interactions.

PHY 491. PRACTICUM **Three to six credits**

PHY 498. TOPICS IN PHYSICS **One to three credits**
Topics dependent on interest and need. May be repeated for credit.

500-Level Courses

PHY 514. OPTIMAL CONTROL THEORY **Three credits**
The calculus of variations and the minimum principle; optimal control of discrete-time systems; optimal control of continuous-time systems; dynamic programming; models of dynamic systems; optimal estimation; stochastic neighboring optimal control. (Same as EE 514)
Prerequisite: PHY 410.

PHY 530. ELECTRODYNAMICS AND RELATIVITY **Three credits**
The Lorentz transformation. The electromagnetic field tensor and covariance. Radiation and plasma dynamics; interactions of electromagnetic waves with matter.

PHY 535. LIGHT SCATTERING **Three credits**
Classical and quantum descriptions of light scattering including Rayleigh scattering, Brillouin scattering and Raman scattering. Scattering in crystals and glasses. Stimulated and spontaneous emission. Coherence and resonance effects.

PHY 540.
STATISTICAL MECHANICS AND TRANSPORT THEORY **Three credits**
Review of thermodynamic concepts; the partition function and phase space. The Einstein model and the Debye model for a crystalline solid. Bose-Einstein and Fermi-Dirac statistics. Random processes and irreversible thermodynamics. Noise and fluctuations. The Onsager relations. The Boltzman transport equation.

PHY 550. ADVANCED QUANTUM MECHANICS **Three credits**
Scattering and scattering cross sections, partial wave analysis; applications. Angular momentum and Clebsch-Gordon coefficients. Stationary perturbation theory; time-dependent perturbation theory; resonant perturbations and the decay or resonantly coupled states.

PHY 571. THEORY OF SOLIDS **Three credits**

Master of Science in Education with a program in Secondary Education/Physics

Admission

For admission to graduate study in Secondary Education/Physics, the applicant should possess an undergraduate degree in physics or in any other related science, mathematics, or engineering area.

Degree Requirements

General requirements for the Master of Science in Education with a program in Secondary Education/Physics are listed under Education on page 35. Specific physics requirements consist of eighteen graduate credits chosen in consultation with the student's advisor in the Physics Department. The advisor may recommend that one or more courses be taken at the 408 level.

PHYSICS 408. TOPICS FOR PHYSICS EDUCATION **One to three credits**
Topics dependent on interest and need. Education students may elect to attend undergraduate 300-level courses under this umbrella course.

Earth and Environmental Sciences

Dale A. Bruns, Ph.D., *Chairperson*

These courses may be taken by special students or may be applied towards graduate degrees offered by other departments. Students planning to apply these credits towards degree programs should secure the approval of their academic advisor prior to inclusion in their course of study.

Courses of Instruction

EARTH & ENVIRONMENTAL SCIENCES 491.
PRACTICUM **Three to six credits**

EARTH & ENVIRONMENTAL SCIENCES 498.
ADVANCED TOPICS **One to three credits**

Selected topics covering a variety of atmospheric, hydrospheric, and lithospheric processes and environmental management issues. May be repeated for credit.

Prerequisite: Graduate standing.

Wilkes University Graduate Program Administration

Dr. Christopher N. Breiseth, President
Dr. J. Michael Lennon, Vice President for Academic Affairs
Dr. Wagiha A. Taylor, Dean of Graduate Studies

School of Business, Society and Public Policy
Dr. Gary A. Giamartino, Dean
School of Liberal Arts and Human Sciences
Dr. Robert J. Heaman, Dean
School of Science and Engineering
Dr. Umid R. Nejib, Dean

Faculty Committee on Graduate Studies

Wagiha A. Taylor	Dean of Graduate Studies Professor of Economics Ph.D. (Clark)
Dale A. Bruns	Professor of Earth and Environmental Sciences Ph.D. (Idaho State)
Thomas M. McCaffrey	Associate Professor of Health Care Administration M.H.A. (Michigan)
Ronald G. Schwartz	Associate Professor of Business Administration Ph.D. (Akron)
Michael A. Steele	Assistant Professor of Biology Ph.D. (Wake Forest)
Sharon G. Telban	Associate Professor of Nursing D.Ed. (Pennsylvania State)

Administrative Support Offices

(717) 824-4651

Admissions
Extension 4400
Chase Hall
184 South River Street

Financial Management Office
Extension 4650
Second Floor, Student Services Building
267 South Franklin Street

Financial Aid Office
Extension 4345
Third Floor, Student Services Building
267 South Franklin Street

International Student Advisor
Extension 4107
Second Floor, Conyngham Hall
130 South River Street

Recorder's Office
Extension 4855
Student Services Building
267 South Franklin Street

Registrar's Office
Extension 4853
Student Services Building
267 S. Franklin Street

GRADUATE WEEKEND
Trimester Calendar
for the 1994-95 Academic Year

Fall 1994— Weekend Meeting Dates

September 10-11
October 1-2
October 22-23
November 12-13
December 3-4

Spring 1995 — Weekend Meeting Dates

January 7-8
January 28-29
February 18-19
March 11-12
April 1-2

Summer 1995— Weekend Meeting Dates

April 22-24
May 13-14
June 3-4
June 24-25
July 15-16

Under normal circumstances, finals for weekend classes will be given on the weekend two weeks after the fifth weekend of classes. The morning classes will hold their final exams on Saturday 9 a.m. to 12 noon and the afternoon classes will hold their final exams on Sunday 9 a.m. to 12 noon.

WILKES UNIVERSITY CALENDAR 1994-1995

SUMMER 1994		
Pre-session		
Classes Commence	Monday, May 23, 1994	8:00 a.m.
Classes End	Saturday, June 11, 1994 *(Including Final Examinations)*	12:00 noon
First Day Session		
Classes Commence	Monday, June 13, 1994	8:00 a.m.
Classes End	Friday, July 15, 1994 *(Including Final Examinations)*	12:00 noon
Nine-Week Evening Session		
Classes Commence	Monday, June 13, 1994	6:00 p.m.
Classes End	Friday, August 12, 1994 *(Including Final Examinations)*	10:00 p.m.
Second Day Session		
Classes Commence	Monday, July 18, 1994	8:00 p.m.
Classes End	Friday, August 19, 1994 *(Including Final Examinations)*	12:00 noon
FALL SEMESTER 1994		
Classes Commence	Monday, August 29, 1994	8:00 a.m.
Opening Convocation and Commencement	Thursday, September 1, 1994	11:15 a.m.
Labor Day Recess	Friday, September 2, 1994	5:00 p.m.
Classes Resume	Tuesday, September 6, 1994	8:00 a.m.
Fall Recess	Thursday, October 20, 1994	10:00 p.m.
Classes Resume	Monday, October 24, 1994	8:00 a.m.
Thanksgiving Recess	Tuesday, November 22, 1994	10:00 p.m.
Classes Resume	Monday, November 28, 1994	8:00 a.m.
Follow Friday Class Schedule	Tuesday, December 6, 1994	
Classes End	Friday, December 9, 1994	5:00 p.m.
Final Examinations Begin	Monday, December 12, 1994	8:30 a.m.
Final Examinations End	Tuesday, December 20, 1994	4:30 p.m.
INTERSESSION 1995	Monday, January 2, 1995 to Friday, January 20, 1995	
SRING SEMESTER 1995		
Classes Commence	Monday, January 23, 1995	8:00 a.m.
Winter Commencement	Thursday, January 26, 1995	11:15 a.m.
Spring Recess	Friday, March 10, 1995	5:00 p.m.
Classes Resume	Monday, March 20, 1995	8:00 a.m.
Easter Recess	Wednesday, April 12, 1995	10:00 p.m.
Classes Resume	Tuesday, April 18, 1995	8:00 a.m.
Follow Thursday Class Schedule	Tuesday, May 9, 1995	
Classes End	Wednesday, May 10, 1995 *(Follow Friday Class Schedule)*	5:00 p.m.
Final Examinations Begin	Friday, May 12, 1995	8:30 a.m.
Final Examinations End	Saturday, May 20, 1995	4:30 p.m.
Commencement	Saturday, May 27, 1995	2:00 p.m.

