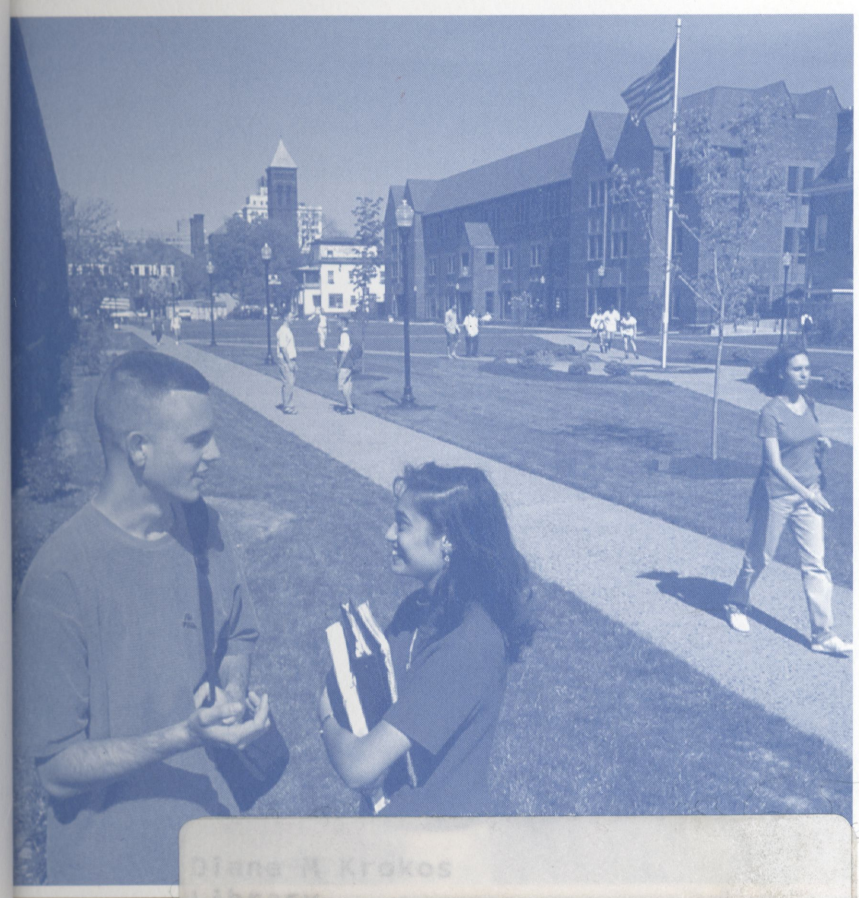
Wilkes University
BULLETIN



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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.

On the Cover: Students gather on the Fenner Quadrangle, a 1000-foot-long greenway at the center of the Wilkes campus. The span is named in honor of Attorney George L. Fenner, Jr. (hon. '97), a Wilkes-Barre attorney and environmentalist whose generosity has helped sustain both Wilkes University and the environment for generations to come.

Wilkes University

1999–2000

Bulletin

Baccalaureate Studies

WILKES UNIVERSITY
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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.

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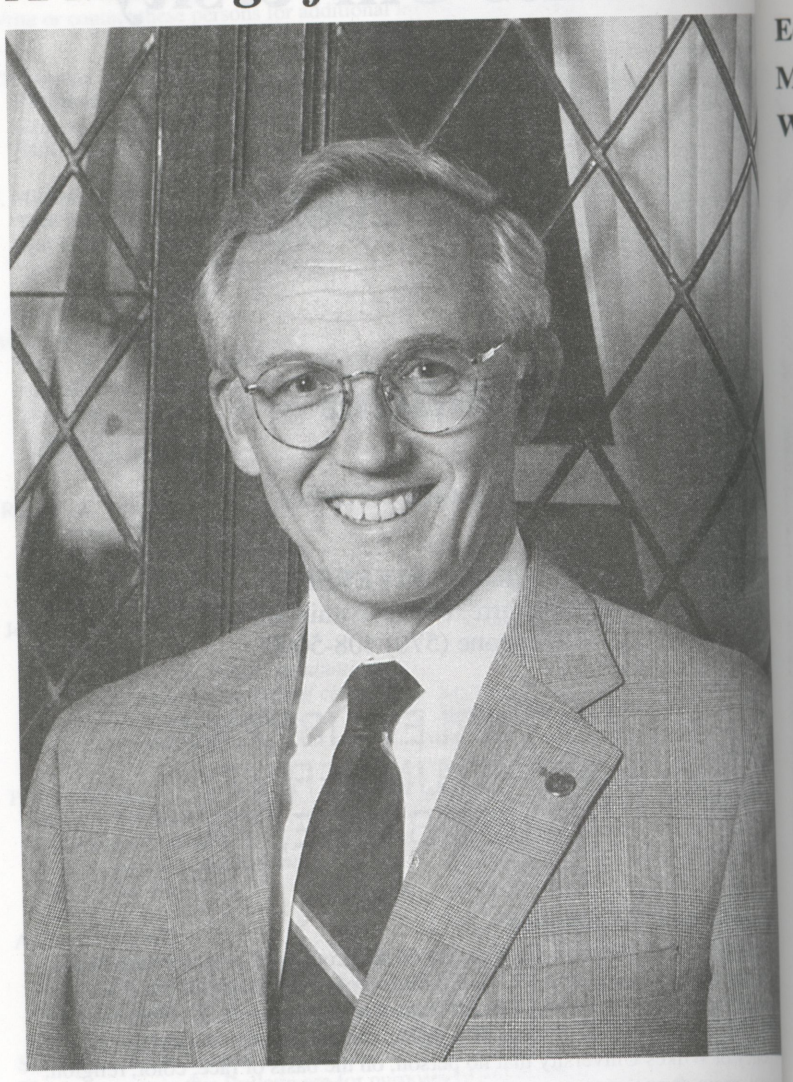
A Message from the President



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.

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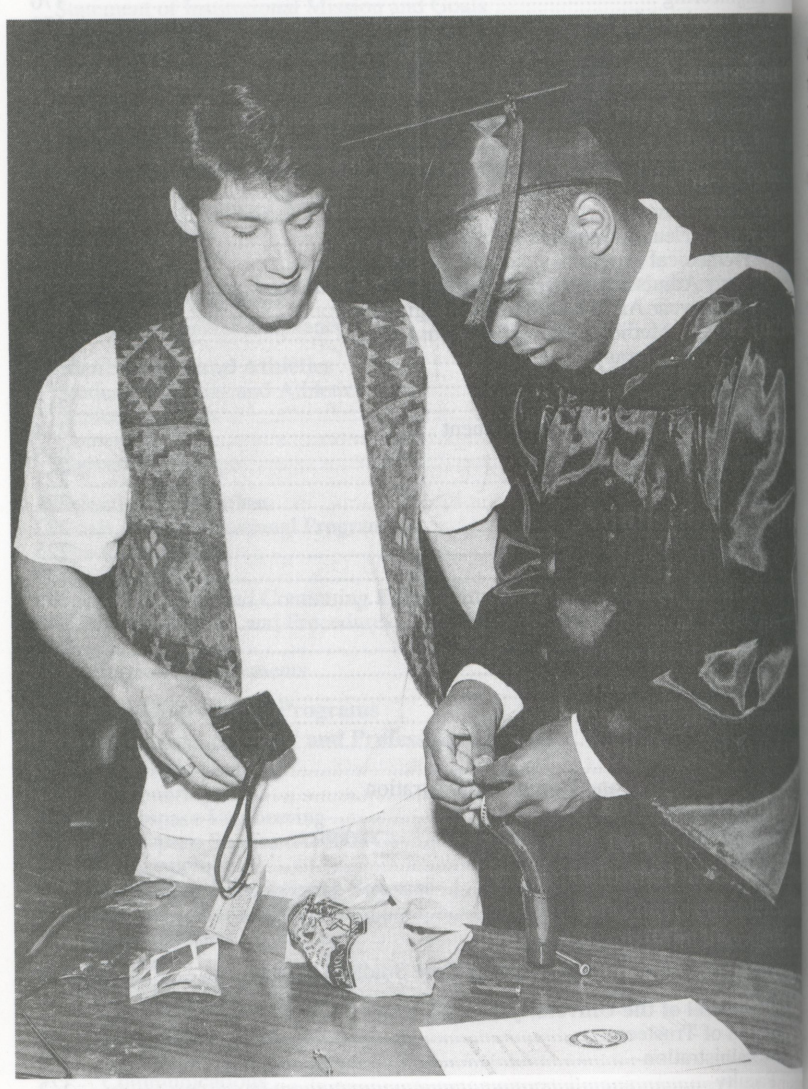

Wilkes University

Overview

Wilkes is a comprehensive, independent institution of 2,200 undergraduate and 1,000 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 two academic units: the School of Arts, Sciences and Professional Studies and the School of Pharmacy. 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 University also offers the Doctor of Pharmacy degree. The park-like campus parallels the Susquehanna River and features the newly constructed Classroom/Office Building, and the 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 120-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 campus. The

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

An active and varied intramural program involves the majority of stude
Intercollegiate athletics encompass thirteen sports. All sports are administe
in strict conformity with NCAA Division III regulations

History

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

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

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

Statement of Institutional Mission and Goals

The Wilkes Tradition

Community Service

Founded in 1933 as a junior college, Wilkes came into existence in t
midst of the economic crisis caused by the simultaneous collapse of anth
cite coal mining in Northeastern Pennsylvania and the onset of the Great D
pression in the nation and the world. The College fulfilled the important m
sion of making higher education accessible to ambitious but underprivile

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 rebirth, 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 o 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 student discover and integrate the intellectual disciplines and to foster critical an creative thought, effective communication, mathematical skills, and compute literacy. Both the General Education Requirements and the total curriculum are periodically reviewed to ensure responsiveness to the important change taking place in higher education and to support a broad but integrative educa tional experience. The strength of a Wilkes education is its balance of th theoretical and practical, of liberal learning and professional preparation. Stu dents have the opportunity of applying knowledge to real problems by work ing in well-equipped laboratories, serving internships, and participating i cooperative education. Beyond balancing theory and practice, a Wilkes edu cation 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 i college life. The Wilkes campus, located in the historic district of downtow Wilkes-Barre, brings together residential and commuting students in an atmo sphere 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 art through the Sordoni Art Gallery, the Dorothy Dickson Darte Center for the Performing Arts, and the cultural events that the University regularly spon sors. The Eugene Shedden Farley Library serves as a comprehensive informa tion and resource center for the region. In response to the needs of busines 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 nontra ditional student through evening and weekend courses. In addition, a growing part of the University's community service is the program for continuing edu cation, which provides courses for learners of all ages.

Building upon solid undergraduate programs, Wilkes also provides an im portant service by offering graduate degrees for students who wish to acquir advanced education in specific professional fields. Most of the graduate pro grams 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 and nursing 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 in the arts and sciences as well as professional fields, including Pharmacy. 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.

FACULTY LIBRARY

Accreditation

Wilkes University offers degrees and programs approved by the Departme of Education of the Commonwealth of Pennsylvania and accredited by the Co mission on Higher Education of the Middle States Association of Colleges a Secondary Schools (3624 Market Street/Philadelphia, PA 19104-2680). Certa academic programs are also individually accredited by appropriate professiona organizations. The Chemistry curriculum is approved by the American Chemic Society. The baccalaureate program in Nursing is approved by the Pennsylvan State Board of Nurse Examiners and is accredited by The National League f Nursing. (National League for Nursing Accrediting Commission/350 Hudso Street/New York, New York 10014). The nursing program has also been grante preliminary approval by the Commision on Collegiate Nursing Education (CCNE For a discussion of what CCNE preliminary approval means, consult the Nur ing section of this Bulletin, page 262. The Electrical Engineering, Environmenta Engineering, Materials Engineering and Mechanical Engineering programs a accredited by the Engineering Accreditation Commission (EAC) of the Accred tation Board of Engineering and Technology (ABET). The Bachelor of Scienc degree in Accounting and the Bachelor of Business Administration degre programs are accredited by the Association of Collegiate Business Schools a Programs. The University is committed to successfully pursue full accreditatio of the Doctor of Pharmacy program with the American Council on Pharmaceutica Education. Currently the program has achieved candidate status. For furthe information on accreditation, please see the discussion under School of Pharmac elsewhere in this bulletin.

Buildings and Facilities

The **E. S. Farley Library**, named for Wilkes' first president, exists to provid its users with effective access to recorded information, whether in printed o electronic format. The Library has acquired a substantial collection of carefull selected materials in a variety of formats and media, including more than 220,00 volumes, 1,100 current journal and newspaper subscriptions, and over 700,00 microforms. Particular subject strengths include English literature, America cultural history, and the history of science. The Farley Library's automated catalo system enables users to search the various collections at Wilkes (books, journal and audiovisual materials) by author, title, subject and keyword on public acces terminals. Online database searching is available to students and faculty via net worked CD-ROM indexing and abstracting services and remote searching o hundreds of data bases through the Reference Department of the Library. Specia facilities include an internet lab, special collections rooms, audio/visual resource and microform equipment. Library collections are supplemented by cooperativ 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. Major renovations were completed in 1995, which included new seating, lighting equipment, stage curtains, carpeting and painting.

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. This modern facility presents exhibitions that enrich campus and community life. Exhibitions are supplemented by lectures, tours, demonstrations, and related art programs. A growing permanent collection embraces all media but is particularly strong in nineteenth and twentieth century American 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 one of the major instructional facilities on campus, and it provides approximately 85,000 square feet of modern classroom, laboratory, studio and office space. The School of Pharmacy occupies the first and third floors of the Stark Learning Center. The first floor houses the Pharmacy Information Center and Computer Lab, Model Pharmacy, and offices. The remodeled third floor includes the Anatomy and Physiology Lab, Pharmaceutics Lab, Three Research Labs, conference rooms, offices, and accessory rooms.

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 West South Street on the Wilkes campus, the Center is the residence of the Allan P. Kirby, Jr., Professor of Free Enterprise and Entrepreneurship. The Kirby Professor directs the Center's activities, develops and teaches courses in entrepreneurship, and fosters and promotes economic freedom and independence through a variety of programs including the campus chapter of Students in Free Enterprise (SIFE). In addition to the formal academic courses in the various aspects of entrepreneurship, the center offers opportunities for experiential learning through internships and real-world-based projects and sponsors special seminars and programs.

Academic Computing Facilities include a campus-wide computer netwo which connects the main academic IBM RS/6000 minicomputer and subn servers located in the Electrical and Computer Engineering Department, th GeoEnvironmental Sciences and Engineering Department, the Mathemati and Computer Science Department, and the Mechanical and Materials Eng neering Department as well as the University's connection to the Interne Microcomputer facilities include: the Computer-Aided Design Laborator the Regional Computer Resource Center Macintosh and MS-DOS Labor tory; the Computer-Aided Engineering Laboratory; the Computer/Simulati Laboratory; the Math/Computer Science Department's IBM PC Laborator the English Department's Writing Center and Writing Center Computer Clas room; the Windows Computer Classroom; the Power Macintosh Classroom and the Art Department's Graphics Laboratory.

Conyngham Hall, refurbished by the Conyngham family and friends, house the Offices of the Deans of Student Affairs and University College, the Offi of Part-time Programs, the Learning Center/Act 101 and the Office Multicultural Affairs

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

The University's **Residence Halls** house 800 students in a variety of livin arrangements in facilities ranging from stately Victorian and Tudor mansion to the ultra-modern accommodations of Evans Hall. Each residence hall staffed by graduate or undergraduate Resident Assistants, who provide guid ance and supervision and assist in the development of a constructive learnin environment. Residence hall space is available to all full-time undergraduat students. All full-time undergraduates of freshman or sophomore standing wh do not commute from the home of a parent or legal guardian **must** reside o campus. Exceptions to this policy may be granted only by the Residence Lif Office or the Office of the Dean of Student Affairs. Any student who is not 1 years of age and does not reside at the home of a parent or guardian must liv on campus. Detailed information regarding residence halls and residence lif can be obtained from the Office of Admissions or the Residence Life Office

The Classroom/Office Building houses the Dean's Suite, and many faculty

from the College of Arts, Sciences and Professional Studies have offices there. The three story, 55,000 square foot facility opened in 1995. It contains thirteen classrooms equipped with audiovisual equipment, state-of-the-art computer labs, a foreign language laboratory, writing laboratory, tutoring laboratory, psychology research laboratories and observation rooms.

The Thomas P. Shelburne Telecommunications Center, a 5500 square foot state-of-the-art television facility, opened in 1995. It includes two full-size production studios and three full-service editing booths.

Pearsall Hall is named for Marion K. and Richard L. Pearsall, a member of the University Board of Trustees, in honor of their daughters. The 9,000 square foot building was purchased and renovated in 1996. It houses the Nursing Department on three floors. The facility includes three simulated hospital rooms, a computer lab, conference room, media room and faculty/staff offices.

The $7.7 million **Student Center/Dining Commons** opened in the Fall of 1999. The 48,000 square foot building features 48 rooms, including a food court/dining commons with a seating capacity for 400 students. In addition, students have a cafe, bookstore, student government offices, meeting rooms, a large dance/entertainment/movie area, information office, TV lounge, game rooms, mail facility, and a student activities club all under one roof. A full-service Pioneer American Bank, N.A., branch is located in a mall-like space on the first floor. Other amenities include a three-story atrium with skylight, and a patio with a balcony looking out over the Susquehanna River.



Admissions

Admission Requirements
Admission Procedures
Advanced Placement

Admission

Recommended High School Preparation

A student's seconday school preparation should include a college preparatory curriculum. Such a curriculum generally includes four years of progressive courses in English, mathematics, science (including at least one laboratory component) and social science. While four years of each are not required, they are recommended for college preparation and admission. Elective courses should be chosen in academic subject areas pertaining to individual interest. Examples of quality electives include computer science, foreign language and communications; and may include the fine arts and technical courses as they relate to desired college majors. Depending on the academic discipline desired, different emphases might be placed on the high school curriculum completed by the applicant. Students whose preparation does not follow the pattern described above may still qualify for admissions but such students must provide other strong evidence that they are prepared for the rigors of the academic requirements of college.

Application for Admission

Applications for admission and instructions regarding secondary school transcripts and records, letters of recommendation, standardized test reports and entrance examinations may be obtained by contacting the Admissions Office. Completed applications should be given or sent directly to the Admissions Office.

Standardized Tests

The Scholastic Aptitude Test (SAT) of the College Entrance Examination Board or the Achievement College Test (ACT) is required of all applicants entering Wilkes University directly from high school. Students should take this examination before the second semester of their senior year in high school. 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 (CEEB): 2977.

Acceptance for Admission and Advanced Deposit

A complete application file includes a completed and signed application for admission, an official copy of the most recent high school and/or college transcript, SAT and/or ACT scores (either official copies or transcripted onto the official high school transcript), and the $30 application.

After the application file is complete the admissions Office will provide a decision. Notification is done on a rolling basis and is generaly complete within two weeks from the date the file is complete.

Resident students guarantee their place in the entering class by forwardin $300 tuition and housing deposit to the Admissions Office. May 1st is the prior deadline for receipt of deposits. Commuter students guarantee their place in entering class by forwarding a $200 tuition deposit to the Admissions Office

Prepharmacy applicants must complete an additional application, sub three letters of recommendation and interview with the School of Pharmac Admissions Committee to gain early admission. Applicants for the Pre-Medi Scholars program must note their interest on the application for admiss and complete an interview with the selection committee to qualify acceptance into the Pre-Medical Program. Applicants for hte degree progr sin music and theatre must audition for and interview with the departm faculty to gain admission into those disciplines.

Wilkes University also accepts applications for the spring semester summer session. Procedures are similar to those followed by students ente in the fall semester.

Admission of Transfer Students

Wilkes University welcomes transfer students from other accredited colle and universities for both the fall and spring semesters. Transfer students m submit an application for admission and a transcript from every post-secondi institution attended (whether credits were earned or not). In some instanc SAT or ACT scores will be required. Some transfer students may be asked complete assessment tests prior to admission.

Admission of transfer students is done on a rolling basis. In addition to admissions decision, transfer students will receive a free transcript evaluati

Applicants must be in good academic standing with a minimum cumulat grade point average of 2.00 (C) at the beginning of the semester they f enroll at Wilkes. All courses with a grade of 2.00 (C) or better that comparable to the curriculum at Wilkes will be accepted for transfer. Stude transferring into the nursing program may only register for courses af consultation with the Chairperson of the Department of Nursing.

Transfer students also applying directly to the School of Pharmacy for en into the professional school must additionally complete a School of Pharm application and forward three letters of recommendation. The student m also sit for the PCAT examination and submit official scores from t examination. After the file is complete, the School of Pharmacy will sched a personal interview as the School deems appropriate.

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

To graduate, all transfer students must complete a minimum of 30 cre (exclusive of advanced placement credit awarded by Wilkes) and a minim of 50% of their major field credits at Wilkes University.

All transfer students must 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 Requirement by completing two courses designated as Writing Intensive. See pages 46-49 of this Bulletin for an explanation of the University's General Education Requirements.

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

Transfer students should consult the Graduation Requirements on page 59 of this Bulletin for institution-wide graduation requirements.

University policy prohibits the Admissions Office from knowingly admitting any student who has been dismissed from any other college or university for any reason 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.

Campus Visits

A campus visit and interview is strongly recommended for all students interested in Wilkes University. Students and family members may schedule an interview by calling or writing the Admissions Office. Campus visits may include an interview with an admissions professional, appointments with faculty members, sessions with coaches and cocurricular leaders, campus and residence hall tours, attendance in selected classes, and financial aid counseling.

In addition to individualized campus visits, the Admissions Office hosts a number of Open Houses during the academic year. These visitation days usually include a general meeting with the admissions staff, panel discussions with current students and administrators, academic department meetings, campus tours, financial aid sessions and a complimentary meal. Specific information about the agenda and dates for these days is available from the Admissions Office.

Admission of International Students

International students are defined as those who do not hold U.S. citizenship or who are not permanent residents of the U.S. or who do not hold resident alien status in the U.S.

International students must submit the following to be considered for admission to Wilkes University: a completed application, official results of the Test of English as a Foreign Language (TOEFL) or evidence of the successful completion of an accredited, intensive English language program, Declaration of Finances Form (available upon request from the Admissions Office), official transcripts of all secondary and/or post-secondary work completed to date (all transcripts should also be accompanied with a translation if in any language other than English), and a copy of the secondary and/or post-secondary diploma or leaving certificate.

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

An I-20 form will only be issued after the application process is comp and the student has been admitted to the institution.

Early Admission of High School Students

Wilkes University will consider admission for high-ability students w wish to enter the University without completing the requirements for a h school diploma. To be considered, such students must provide all the mater listed under the Acceptance of Admission and Deposit section and at leas letter from a high school official granting approval for early admission, they must attend an interview with the Admissions Office.

Readmission to the University

Students who have been enrolled full-time at Wilked University and h terminated their studies for one semester or more, and who wish to retur full-time students, must contact the Student Affairs Office and arrang interview with one of the deans as the first step in the readmission proce

Admission of Part-time Students

Those who wish to enroll as part-time students must contact the Offic Part-time Programs to discuss their plans and to obtain an Application Admission. Students who have completed college-level work at another i tution must submit an official transcript of their work as part of the admis process. Those who have completed no college work must submit an offi high school transcript as part of the admission process. All documenta should be sent to the Office of Part-time Programs.

From Part-time to Full-time Admission

Part-time students who wish to enroll as full-time students must con with the Director of Part-time Programs as the first step in this process. Stud who have completed 30 or more credits and have maintained a cumul grade point average of 2.00 (C) or higher will be accepted as full-time stude Students who have completed fewer than 30 credits will be requried to pro high school transripts and appropriate test scores in support of their petitio enroll full-time **before** a decision will be made.

Advanced Placement Credit

Wilkes University encourages students to work to their full capacity an advance as rapidly as appropriate in their academic work. A number of opp tunities are open to qualified high school juniors and seniors, as well a

adults returning to school after an interval of work or military experience, to demonstrate competence beyond those normally associated with graduation from high school. Academic credit may be granted for such demonstrated competencies through a variety of channels as described below.

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 on the Advanced Placement examination. 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 Admissions Office.

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 coursework. 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 Admissions Office.

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 determine approval of the student's application in writing only on the basis of a judgement that the student has adequate background in the field. If denied a challenge examination, the student may appeal to the appropriate academic dean. The student may not challenge a course that he/she previously failed.

A $55 per credit fee will be assessed by the Financial Management Office for each approved challenge examination. The student must present a receipt from the Financial Management Office to the department chairperson at least thirty days prior to the examination date. Credit for the course is given and transcripted if the student passes the examination. No grade or credit is recorded if the student does not pass the examination.

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College-Level Examination Program (CLEP)

Wilkes University grants credit on the basis of satisfactory performance the Subject Examinations, not hte General Examinations, of the College-Le Examination Program (CLEP) administered by the College Entra Examination Board. Although the program is designed primarily for adu exceptionally well qualified high school seniors may find it advantageou seek academic credit through CLEP. Inquiries about CLEP should be addres to the Admissions Office. Official scores on CLEP Subject Examinations sho be forwarded directly to the Admissions Office.

Experiential Learning

Credit for life experience may be granted for documented college-level lea ing that a student acquired through non-collegiate experiences. This credi awarded for the learning derived from life experiences, **not** for the exp ences themselves.

Students who plan to petition for experiential learning credit must inf their academic advisor of their intent within the first semester of enrollme the University. All other means of securing credit for demonstra competencies must have been exhausted before applying for experie learning credit.

Credit awarded for experiential learning is based exclusively on Wil evaluation of the demonstrated knowledge which is presented in the stude petition for experiential learning credit. Specific guidelines and proced for the petitioning and awarding of experiential learning credits are avail to interested students at the Registrar's Office. The Academic Standards C mittee of the faculty maintains the guidelines and procedures of the Polic Experiential Learning and makes the final decision on the awarding of cr



Expenses and Financial Assistance

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

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Student Expenses

The following chart summarizes student expenses for the 1999-00 academ year which officially begins with the Summer Session, 1999. Students a referred to the course descriptions in this Bulletin for laboratory and oth fees associated with particular courses. Inquiries about particular charges shou be addressed to the Financial Management Office.

Student Expenses for 1999-00

Full-time Undergraduate:	Assessment	Each Semester	Total for Ye
* Tuition (12-18 Credits)	Per Semester	$ 7,826	$15,652
Room:			
in Rifkin , McClintosh 17, & Fortinsky Halls	Per Semester	$ 2,367	$ 4,734
in Pickering Hall	Per Semester	$ 2,000	$ 4,000
in Other Residence Halls	Per Semester	$ 2,142	$ 4,284
Board			
19 Meal Plan	Per Semester	$ 1,409	$ 2,818
14 Meal Plan	Per Semester	$ 1,310	$ 2,620
Commuters Only			
10 Meal Plan	Per Semester	$ 850	$ 1,700
Room Damage Deposit	One Time	—	$ 50
General University Fee	Per Semester	$ 235	$ 470
Activity Fee	Per Semester	$ 50	$ 100
Technology Fee	Per Semester	$ 50	$ 100
Student Union Fee	Per Semester	$ 20	$ 40

*Credits above 18 will be assessed at the rate of $434 per credit hour.

Part-time Undergraduate:			
Tuition (1-11½ credits)	Per Credit	$ 434	—
General University Fee	Per Credit	$ 9	—
Technology Fee	Per Credit	$ 3	—
Summer Sessions — Undergraduate:			
Tuition	Per Credit	$ 434	—
General University Fee	Per Credit	$ 7	—
Technology Fee	Per Credit	$ 3	—
Summer Board	Per Week	$ 119	—
Summer Room	Per Week	$ 119	—
Room Damage Deposit	One Time	$ 50	—
Other Fees:			
Acceptance Deposit:			
Residence Hall	One Time	$ 100	—
Tuition	One Time	$ 200	—
Application Fee	One Time	$ 30	—
Applied Music Fee:			
½ hour private lesson		$ 361	—
1 hour private lesson		$ 722	—

Audit Fee (Undergraduate Courses):			
Full-time Undergraduate Students	No Tuition Charge	—	—
Graduate and Part-time Undergraduate Students	Per Credit	$ 217	—

Other Fees and Charges:	Assessment	Each Semester	Total for Year
Challenge Exam	Per Credit	$ 55	—
Graduation Fee	One Time	$ 135	—
Late Registration Fee	Per Semester	$ 25	—
Medical Technology Fee (During Clinical Training)	Per Semester	$ 934	$ 1,868
Music Major Fee	Per Semester	$ 30	$ 60
New Student Matriculation	One Time	$ 100	—
Nurses Professional Liability Insurance	Per Year	—	$ 15
Replacement of Lost ID Cards	Each	$ 10	—
Returned Check Charge	Each	$ 25	—
Televideo Fee	Per Course	$ 40	—

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 semest charges and approved financial aid are mailed to all registered students. A payments are made directly to Wilkes University, P.O. Box 111, Wilkes-Barr PA 18766. Questions concerning charges or payments should be directed the Coordinator of Student Accounts in the Financial Management Office.

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

Fall and Spring Full-time Tuition

The unfunded cost of full-time tuition and fees will be paid or satisfactor arrangements made with the Director, Financial Management, or his designe two weeks before the day on which classes begin. Unfunded costs are define 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 stude account for each semester or other instructional period. Satisfactory arrang ments 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 (ROT Scholarship, Bureau of Vocational Rehabilitation, Office of the Blind, etc.

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

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

All financial arrangements are to be processed by the Director, Financi Management, or his designee and approved by the Vice President, Busine Affairs/Auxiliary Enterprises or his designee. **No other University officer employee will be permitted to negotiate financial arrangements for th 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, 1 AMS Place, P.O. Box 991, Swansea, MA 02777 or call 1-800-635-0120.

The following financial institutions provide educational loans for parents and students:

Key Education Resource Group
for information, call 1-800-key-lend
PNC Bank Resource Loan
for information, call 1-800-762-1001
First Union Bank of Delaware
for information, call 1-800-504-4097

VISA/MasterCard

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

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.

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Refunds

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

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

Students suspended from the University for disciplinary reasons will forf 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 tuit charges, less a deposit of $200, if *written* notice of cancellation is received by the Registrar on or befor the first day of classes. Failure to submit proper written notification will result in the assessment of f charges.	
	Policy guidelines for refunds processed after the first day of classes are as follows:	
Total Withdrawal	First Two Weeks	90%
	Third & Fourth Weeks	50%
	Fifth-Eighth Weeks	25%
	After Eighth Week	No refund
Full-time to Part-time and Reduction of Part-time Load	Above time-schedule applies for courses dropped	Charges based on th number of credits after the withdrawa
Room and Board:		
Room	The institution will refund housing rental charge 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, written notification of cancellation is made to the Director, Residence Life Office, on or before the fir 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	50%

	of Evening Session	
	After stated period	No refund
Weekend College	Through second weekend	50%
	After second weekend	No refund

*Deposits 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.**



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Financial Aid

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

Students with questions about financial aid or students seeking applic tions for financial aid should contact the Financial Aid Office. More detail information regarding the financial aid programs and requirements is include in the **Consumer's Guide to Financial Aid, Costs, and Charges at Wilk University**, which is also available at the Financial Aid Office and on th Wilkes University Web Site (www.wilkes.edu).

Application Procedures

1. Submit the Wilkes University Application for Financial Aid to the Wilk 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 PLU Program must also complete the appropriate promissory note applicatio

Renewal of Financial Aid

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

Types of Financial Aid

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

Scholarships: Outright gift assistance that is not repayable by the recipie and is usually based on factors other than demonstrated financial need, a though some are a combination of need and merit. Several academic areas the University have scholarhips available to qualified students. These inclu Biology, English, Music, Nursing and Sociology

Grants: Outright gift assistance that is not repayable by the recipient but based on demonstrated financial need of the applicant and the family. Many sta in addition to Pennsylvania provide financial assistance in the form of grants t residents of their states. Residents of states other than Pennsylvania should cont

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. and Carol R. 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 Passan Hall to assist students in obtaining benefits.

Financial Aid for Part-time Students

The Pell Grant, S.E.O.G., PHEAA Grant, 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, the Wilkes Financial Aid Application, and the appropriate loan applications in order to apply for these programs. In addition to financial need, eligibility is based on enrollment status. 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. Except for the Pell Grant program, students must be enrolled at least half-time to qualify for financial aid.

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 (FAFSA), Wilkes Financial Aid Application, and the appropriate loan applications must be completed to determine eligibility for these programs.

Financial Aid for Pharmacy Students in Years Five and Six

Since years five and six of the pharmacy program contain coursework which is considered post-baccalaurete level, these years are considered professional graduate level for financial aid purposes. Therefore, students enrolled at the level are considered independent for financial aid purposes and qualify only for financial aid available to graduate/professional students. This financial aid includes the subsidized and unsubsidized Stafford Loans with an annual loan maximum of $18,500. Students will not qualify for any federal, state or institutional grants or scholarships.



Summary of Financial Assistance Programs*

Program	Average Annual Award	Application(s) Required	Filing Deadline
		SCHOLARSHIPS	
University Scholarship	$ 6,000	Free Application for Federal Student Aid (FAFSA) and Wilkes Financial Aid Application	Upperclass student deadline — May 1, 1999 Incoming student priority date — March 1,1999
Presidential Scholarship	$ 4,650		
Achievement Scholarship	$ 3,800		Contact Wilkes Admissions Office
Multicultural Service Scholarship	$ 1,600		
Leadership Scholarship	$ 2,800		
Room & Board Scholarship	$ 6,830		
Wilkes Named Scholarships	$ 1,400		
Transfer Student Scholarship	$ 1,600		
ROTC Scholarship	$ 8,500	Contact the Wilkes ROTC Office	Contact ROTC Office
Pharmacy Scholarship	$ 2,000		
		GRANTS	
Federal Pell Grant	$ 1,930	Free Application for Federal Student Aid (FAFSA) and Wilkes Financial Aid Application	June 30, 2000
PHEAA Grant	$ 2,500		May 1, 1999
Federal SEOG Grant	$ 1,200		Upperclass student deadline — May 1, 1999
Wilkes Need-Based Grant	$ 3,000		Incoming student priority date — March 1,1999
Office of Vocational Rehabilitation Grant	$ 3,500	Contact the Office of Vocational Rehabilitation	Contact Office of Vocational Rehabilitation
		LOANS	
Federal Carl Perkins Loan (NDSL)	$ 1,850	Free Application for Federal Student Aid (FAFSA) and Wilkes Financial Aid Application	Upperclass student deadline — May 1, 1999 Incoming student priority date — March 1,1999
Federal Nursing Student Loan	$ 2,340		
Gulf Oil Loan	$ 1,900		
Rulison Evans Loan	$ 1,900		
Federal Stafford Loan	$ 3,750	Stafford Student Loan Application and Free Application for Federal Student Aid (FAFSA)	Six to eight weeks prior to need for loan proceeds
Federal Unsub Stafford Loan	$ 3,450		
Federal PLUS Loan	$ 7,000	PLUS 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	$ 900	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 and Free Application for Federal Student Aid (FAFSA)	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**.

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Achievement Scholarship	$ 3,800		
Multicultural Service Scholarship	$ 1,600		
Leadership Scholarship	$ 2,800		
Room & Board Scholarship	$ 6,830		
Wilkes Named Scholarships	$ 1,400		
Transfer Student Scholarship	$ 1,600		
ROTC Scholarship	$ 8,500	Contact the Wilkes ROTC Office	Contact ROTC Office
Pharmacy Scholarship	$ 2,000		
		GRANTS	
Federal Pell Grant	$ 1,930	Free Application for Federal Student Aid (FAFSA) and Wilkes Financial Aid Application	June 30, 2000 May 1, 1999 Upperclass student deadline — May 1, 1999 Incoming student priority date — March 1,1999 Contact Office of Vocational Rehabilitation
PHEAA Grant	$ 2,500		
Federal SEOG Grant	$ 1,200		
Wilkes Need-Based Grant	$ 3,000		
Office of Vocational Rehabilitation Grant	$ 3,500	Contact the Office of Vocational Rehabilitation	
		LOANS	
Federal Carl Perkins Loan (NDSL)	$ 1,850	Free Application for Federal Student Aid (FAFSA) and Wilkes Financial Aid Application	Upperclass student deadline — May 1, 1999 Incoming student priority date — March 1,1999
Federal Nursing Student Loan	$ 2,340		
Gulf Oil Loan	$ 1,900		
Rulison Evans Loan	$ 1,900		
Federal Stafford Loan	$ 3,750	Stafford Student Loan Application and Free Application for Federal Student Aid (FAFSA)	Six to eight weeks prior to need for loan proceeds
Federal Unsub Stafford Loan	$ 3,450		
Federal PLUS Loan	$ 7,000	PLUS 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	$ 900	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 and Free Application for Federal Student Aid (FAFSA)	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**.

FARLEY LIBRARY

Student Affairs and Athletics

Student Activities and Athletics
Student Services
Counseling
University College

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 in the dining hall in the Student Union. Residents have the option of choosing either a nineteen or a fourteen meal per week plan. Students who live in Rifkin, Fortinsky and the South River Street Apartments have the option of selecting the nine-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 fundi requires that clubs and organizations be actively involved in community se vice. An Inter-Residence Hall Council, a Commuter Council, and an Off-Cam pus Students Council organize activities for undergraduate students, and th Student Programming Board oversees a full schedule of social events at th University.

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

Honor Societies

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

ALPHA CHI (Upper Division Students)
ALPHA KAPPA DELTA (Sociology)
ALPHA SIGMA LAMBDA (Part-time Students)
CHI ALPHA EPSILON (Act 101 Students)
DELTA MU DELTA (Business and Accounting)
ETA KAPPA NU (Electrical Engineering)
LAMBDA PI ETA (Communications)
OMICRON DELTA EPSILON (Economics)
PI KAPPA DELTA (Forensics)
PI SIGMA ALPHA (Political Scienc
PHI ALPHA THETA (History)
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 intercolle giate competition in 13 varsity sports. Varsity programs for women inclu basketball, field hockey, soccer, softball, tennis and volleyball; men compe at the varsity level in baseball, basketball, football, golf, soccer, tennis an wrestling. Varsity teams compete at the Division III level. The University is member of the Middle Atlantic States Collegiate Athletic Conference (MAC the Eastern Collegiate Athletic Conference (ECAC), and the National Colle giate Athletic Association (NCAA).

The goal of the intramural program is to provide a comprehensive set recreational and fitness activities throughout the academic year for the Un versity community. Students, faculty and staff participate in individual, du and team competitions in traditional sports as well as in innovative activitie like Plyometrics, Free Throw Competition and Aerobics. Events are organize in structured tournament competition and one-day special events, using th indoor facilities of the Marts Center as well as the spacious grounds of th Ralston Field Complex.

Wilkes places the highest priority on the overall quality of the educationa experience and on the successful completion of the student's academic pr

grams. The University seeks to establish and maintain an environment in which a student-athlete's athletic activities are conducted as an integral part of the educational experience. The athletic and intramural programs function, then, in an environment that provides for the health and welfare of the student-athletes and values cultural diversity, gender equity, principles of fair play and amateur athletics competition throughout the University community.

University Activities

In addition to the curricular and co-curricular activities of particular organizations, a number of all-campus and campus-community events are held each year. Family Visitation Day, Homecoming, Winter Weekend, and the Annual Block Party 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 discov their own abilities and potential and to assist them in making sound, indepe dent decisions. Students are expected to consult regularly with classroom i structors, faculty advisors, the student affairs deans, department chairperson or academic deans regarding academic matters. Recognizing that students som times need additional guidance in resolving personal, social or academic prob lems, the University has also institutionalized a variety of programs to assi students, individually and in groups.

The Student Affairs Office

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

New-Student Orientation Program

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

Health Service

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

In times of escalating health care costs it is essential for students to ha 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.

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. 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.

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 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 sixty organizations send employer representatives to meet with students about available career opportunities. In addition, CAREER EXCHANGE, a program spon-

sored 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.

Writing Center

The Writing Center, located in the Classroom/Office Building, 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.

Day Care Service

Since 1982, the University has provided partially subsidized day care service to full-time students with a certain goup of approved local providers. The service offers regular day care services at a reduced fee to students. 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.

University College

University College, housed in the Conyngham Student Center, provides enrollment and advising services for all part-time undergraduates; is the point of entry and home for all undeclared students until they select their major field of study; provides academic support services and supplemental instruction for all enrollees and prospective students; administers Summer School, Intersession and the Weekend undergraduate programs; administers the University's precollege enrichment programs; coordinates with the academic departments to provide an effective program of academic advisement; and offers special advising and support services for the University's adult and international student populations.

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 have not identified a major work with advisors from University College who have a special expertise

in advising undeclared students. University College advisors work with undeclared students until a major field has been chosen; these students then are assigned to a departmental advisor.

Learning Center

The Learning Center, third floor of 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.

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.

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.

Academic Information

Goals of the Educational Program
The Curriculum
The Degrees
Adult, Graduate and Continuing Education
Academic Policies and Procedures
Academic Requirements
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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 late August and concludes with final examinations in December. The spring semester begins in mid-January and closes with a final examination period in May. Commencement exercises are held at the close of the fall and spring semesters. A one-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.

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, 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 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 ..... 0-4 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 132.

   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, a CLEP test grade in the 50th or higher precentile.
   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 500 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. It is strongly recommended that one or both be designated as a "wellness" course. No academic credit is awarded. The Physical Fitness requirement may also be met by completion of two Dance performance courses or one Physical Education course and one Dance performance 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, Music and Pharmacy 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 a 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

*** The following courses focus primarily on writing or linguistics, and so may not be used to fulfill the Area I literature requirement: English 101, 201, 202, 203, 222, 225, 302, 303, 304, 308, 324.**

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 101 or higher, 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 or 3 credits in performance
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, Music and Pharmacy 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 extracurricular 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 honor 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 concentrati in order to graduate. Specific requirements for each major are described detail in the departmental listing in this Bulletin. The major must be declar 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 t following subject areas:

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

Bachelor of Science Degrees — Majors

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

- Accounting
- Biochemistry
- Biology
- Chemistry
- Computer Information Systems
- Computer Science
- Earth and Environmental Sciences
- Electrical Engineering
- Engineering Management
- Environmental Engineering
- Individualized Studies
- Mathematics
- Mechanical Engineer
- Medical Technology
- Nursing

Bachelor of Business Administration Degree — Business Major

Bachelor of Music Degree — Majors in Performance and Music Educati

Teacher Education

Students who wish to prepare for a teaching career in secondary scho select an appropriate disciplinary major and use their elective credits to me teacher-certification requirements. Music Education majors must compl all components of the program and secure the approval of the faculty of t Department of Visual and Performing Arts. Students who wish to prepare a teaching career in elementary education select an appropriate disciplina major and major in elementary education. A list of the courses needed certification is provided in the departmental description of the Educati Department in this Bulletin. Students planning a teaching career must se 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 Humanities.

Double Major

Students may choose to use their elective credits to complete a second m
jor. The student must declare intent to graduate with a double major by co
pleting the appropriate form at the Registrar's Office. It is the student's r
sponsibility to secure the approval of the chairpersons of both departments
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 fro
this or another accredited institution may earn a second baccalaureate degr
at Wilkes by completing a major in another discipline, provided the followi
conditions are met. **All** candidates for the second degree must earn at lea
thirty credits at Wilkes beyond those earned for the first degree and they mu
meet all of the Wilkes requirements for a degree. Wilkes students may
graduated with two bachelor's degrees simultaneously, but they must co
plete 30 credits beyond the requirements for the first degree to be eligible f
the second degree.

Adult, Graduate and Continuing Education

Part-time Studies

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

Non-degree students may be admitted to classes which they are qualified
take by reason of their maturity, previous education, and work experien
Secondary school training is desirable, but not necessary, provided the s
dent is qualified to follow such special courses of instruction. Inquiries abo
all of these programs should be directed to the Office of Part-time Progra

Evening Program

The Evening Program is designed to meet the needs of those students wh
cannot attend daytime classes but wish to pursue a degree. Courses genera
meet one or two nights per week during the academic year and two nights p
week during the nine-week evening summer session. Majors in the follow
fields are provided in the evening: Accounting, Business Administration, Co
puter Information Systems, Earth and Environmental Sciences, Electri
Engineering, Engineering Management, Environmental Engineering, a
History. Students interested in evening courses should contact the Office
Part-time Programs to plan their courses of study.

Weekend Program

Wilkes's Weekend Program provides upper-division courses on the campus of Keystone College in La Plume, Pennsylvania, enabling graduates of Keystone 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, Psychology, and Sociology. Students beginning as freshmen in the Weekend Program apply for admission to Keystone 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 Part-time Programs. Beginning with the Spring Semester, 2000, the Wilkes Weekend Program will relocate to the main campus in Wilkes-Barre.

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 Office of Part-time Programs 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), Mathematics and Nursing.

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 s
sions that precede each semester. All students are expected to preregister w
their advisors and to register on the dates specified on the University Cal
dar. Additional information on registration procedures and the exact dates
the orientation sessions can be obtained from the Office of Admissions or t
Registrar's Office.

Attendance

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

Student Load

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

Wilkes/College Misericordia/King's Cross-Registration

Wilkes University, College Misericordia and King's College offer their s
dents an opportunity to cross-register for courses at the other institutions. S
dents register through the Registrar at the institution at which they are e
rolled as degree candidates. Interested students should confer with the Reg
trar for further details.

Auditing Courses

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

Students auditing courses will maintain all standards, including attendan
required by the instructor. Students who do not maintain these standards w
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
advisor and the department chairperson. The student shall satisfy the curr

lar 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 College Misericordia and 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** for 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 h or her academic progress. Grade reports are sent to students at the end of ea 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 credit.
1.00	Academic achievement of minimum quality required for cre
0.00	Academic achievement below the minimum required for cou credit.
P	Passing, no credit.
W	Withdrawal.
N	Audit, no credit.

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

Course Credits and Grade Point Averages

Each course at the University is assigned a specific number of credits. F example, History 101 is a 3-credit course and Chemistry 115 is a 4-cr course. Usually, credits assigned to the course are determined by the num of hours that the class meets per week. Credits may also be defined by total number of hours a class meets per semester. Over the length of a sem ter, a credit hour is equivalent to 15 hours of classroom contact plus appro ate outside preparation; or 30 hours of supervised laboratory plus appropr outside preparation; or 45 hours of internship/clinical experience; or a com nation of the foregoing.

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

Course	Credit Hrs. Attempted		Grade		Quality Points	Credit Hrs. Passed
Art 101	3	x	4.00	=	12	3
Psy 101	3	x	0.00	=	0	0
Fr 101	3	x	2.50	=	7.5	3
Hst 101	3	x	1.50	=	4.5	3
Mus 101	3	x	3.00	=	9	3
Total credit hours attempted	15					
Total credit hours passed						12
Total quality points earned					33	

Average 33q.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 thirty-six or fewer 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 allowe
to enroll in any course work at Wilkes for a period of one semester. To b
considered for readmission such students must apply to the Academic Sta
dards Committee and be approved for readmission with a probationary statu
Students applying for readmission must present evidence of enhanced pro
pects for academic success.

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

Academic Honesty

Academic honesty requires students to refrain from cheating and to provid
clear citations for assertions of fact as well as for the language, ideas an
interpretations of others that have contributed to their written work. Failure t
acknowledge indebtedness to the work of others constitutes plagiarism, a ser
ous academic offense that cannot be tolerated in a community of scholars. A
instances of academic fraud will be addressed in accordance with the policie
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 subjects within their major.
5. Achieve a minimum 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 participations 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 College of Arts, Sciences and Professional Studies

Departments

Aerospace Studies
Biology, Chemistry, and Health Science Programs
Business Administration and Accounting
Education and Psychology
Engineering and Physics
Geo-Environmental Sciences and Engineering
Humanities
Math and Computer Science
Nursing
Social Sciences and Communications
Physical Education and Health
Visual and Performing Arts

The School of Pharmacy

Departments

Pharmaceutical Sciences
Pharmacy Practice

Academic Programs

Interdisciplinary Courses

The College of Arts, Sciences and Professional Studies

Bonnie C. Bedford, Ph.D.
Dean of the College

The College of Arts, Sciences, and Professional Studies was created in 1998 following a year long study of how best to serve students, faculty, and programs. The former School of Science and Engineering, the School of Liberal Arts and Human Sciences, and the School of Business, Society, and Public Policy were combined to form the new College. The reorganization has maintained the wide diversity of programs offered and the high quality within those academic programs. The newly designed college has allowed for a more interdisciplinary, integrated approach in curriculum for faculty and curricular choices for students. A goal of the College is to provide a sound general education for all graduates and to insure a quality professional preparation within each major program. In other words, each program provides the necessary skills for professional employment and job success in concert with those qualities all educated, productive citizens should possess.

In the General Education courses within the College, students will take courses that teach them to think critically and creatively, to communicate their knowledge effectively, and to understand their place in a complex, diverse, and changing world. Within the disciplines, students will study with talented faculty in extending the boundaries of human knowledge through scholarship, research, field work, and artistic expression.

The College offers both undergraduate and graduate degrees in programs ranging from the visual and performing arts to engineering and nursing. The College also offers several pre-professional programs leading to postgraduate work in law and the health care industry. The professional studies programs in engineering, nursing, and accounting are accredited by national professional organizations, signifying the high quality of each of these diverse programs. Many undergraduate programs offer valuable field work experience through industry co-ops and internships.

The College is enriched culturally, academically, and industrially through a strong regional connection in all areas. The College is linked to various special programs on campus that enhance the arts, sciences, and professional studies opportunities. Such special opportunities in the arts include the Encore Summer Music Camp, the Wilkes Community Conservatory, and the Sordoni Art Gallery. The science special programs include the GIS Mapping and Remote Sensing Center, the Ratchford Field Station, and the Environmental Quality Center. The

College's professional studies programs are enriched with a connection to t
Small Business and Development Center, the Allan P. Kirby Center f
Entrepreneurship, and the Survey Research Center. Their existence on camp
offers students the opportunity to see and to experience the best and the m
advanced in the arts, sciences, and industry.

The University offers state-of-the-art facilities in all areas. The College progra
incorporate the best of these facilities into their discipline offerings. F
example,the Dorothy Dickson Darte Center for the Performing Arts has cutt
edge theatre technology that showcases campus performances in music, theat
dance and visiting lecturers in all disciplines. The Shelburne Telecommunicatio
Center allows students the opportunity to work in a professional television stud
and with state-of-the-art Distance Leanring equipment. Also, the College hous
the Regional Computer Resource Center which provides microcompu
laboratories and technical support to teachers enrolled in graduate study at Wilk

The College includes the following academic departments:

Aerospace Studies
Biology, Chemistry, and Health Science Programs
Business Administration and Accounting
Education and Psychology
Engineering and Physics
Geo-Environmental Sciences and Engineering
Humanities
Math and Computer Science
Nursing
Social Sciences and Communications
Physical Education and Health
Visual and Performing Arts

The College offers the following undergraduate degrees:

Bachelor of Arts Degree—Majors

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

Bachelor of Science Degree—Majors

Accounting
Biochemistry
Biology
Chemistry
Electrical Engineering
Engineering Management
Environmental Engineering
Individualized Studies

Computer Information Systems
Computer Science
Earth and Environmental Sciences
Mathematics
Mechanical Engineering
Medical Technology
Nursing

The College offers the following graduate degrees:*

Master of Business Administration
Master of Science in Education
Master of Science in Electrical Engineering
Master of Science in NursSchool of Pharmacy

* For more information on any of these master's programs and their various options, please consult the Wilkes Graduate Bulletin.

School of Pharmacy

Bernard W. Graham, Ph.D., R.Ph.
Dean of the School

The School of Pharmacy offers a four year professional program leading to the Doctor of Pharmacy (Pharm.D.) degree. Graduates of the program are eligible for state examination to become licensed pharmacists. The four years of education consist of three years of in-class (i.e., lecture, laboratory, discussion group) education and one year of experiential education. The professional pharmacy program at Wilkes is new as the first professional class entered the School in the fall of 1996 and will graduate in May 2000.

Our Mission

The primary mission of the Wilkes University School of Pharmacy is to provide a dynamic, challenging and comprehensive curriculum focused on the future that will serve as the foundation for life-long learning and practice. Our graduates will be able to provide quality patient care in a wide range of health systems in metropolitan and rural areas and will be potential leaders in the profession. Consistent with the Wilkes University tradition, the School of Pharmacy brings together qualified students and a dedicated faculty and staff from a variety of disciplines in a supportive atmosphere that encourages each student's intellectual and personal development. Although our primary mission is professional education, research and practice are valued primarily as they support our commitment to educational excellence and faculty development. Finally, we seek to be a good corporate citizen through meaningful service to the University, the profession and the local community.

Attainment of accreditation by the American Council on Pharmaceutical Education (ACPE) is a multi-stage process for a new pharmacy school. The first stage is receipt of **PRECANDIDATE** status which is awarded to schools that have no students and are developing a doctor of pharmacy program.

PRECANDIDATE status indicates that a school has taken into account ACP standards and guidelines and suggests reasonable assurance of moving to th next step of **CANDIDATE** status. Wilkes University receive **PRECANDIDATE** status on July 1, 1996.

A new doctor of pharmacy program that has students enrolled but has not ha a graduating class may be granted **CANDIDATE** status. The granting **CANDIDATE** status denotes a developmental program which is expected t mature in accord with stated plans within a defined time period. Graduates of class designated as having **CANDIDATE** status have the same rights an privileges as those graduates from a fully **ACCREDITED** program. On July 1997 Wilkes University was awarded **CANDIDATE** status effective through Jun 30, 1999 and subsequently renewed until June 30, 2000. An on-site evaluatio will be scheduled during the 1999-2000 academic year for purposes of considerin continuation of **CANDIDATE** status or advancement to **ACCREDITED** statu

Admission

To be admitted into the profesional program of the School of Pharmacy, student must have either enrolled and successfully completed the ***prepharmac*** program at Wilkes University or have submitted a successful ***application*** t the School of Pharmacy. For information about admission into the *pre-pharmacy* program at Wilkes University, please see the **PrePharmac Program** description found elsewhere in this Bulletin. For information abou successful completion of the prepharmacy program and the application proces see the **Pharmacy Program** description found elsewhere in this Bulletin.

Facilities

The School of Pharmacy is housed in the Stark Learning Center overlook ing the Susquehanna River. Recently completed renovations yielded moder pharmaceutical teaching and research laboratories, case conference rooms, pharmacy information center, student activities space and faculty offices. Mos lecture classes are held in other areas of the Stark Learning Center or in th new (fall 1995) Classroom Office Building located across the courtyard fro the Stark Learning Center.

Faculty

There are two academic departments in the School of Pharmacy. The De partment of Pharmaceutical Sciences includes faculty in such areas as pha macology, pharmaceutics and pharmacy administration. The Department o Pharmacy Practice includes faculty with practice specialties in such areas a drug information, general medicine, primary care, critical care and cardio ogy. When at full strength, the School of Pharmacy will have approximately twenty-five full-time faculty members.

Academic Programs

ACCOUNTING

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

Total minimum number of credits required for a major in Accounting leading to the B.S. degree — 121.
Total minimum number of credits required for a minor — 18.

The Business Administration and Accounting Department 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 contains a minimum of three tiers. The **first tier** begins with a comprehensive study of the arts, sciences, mathematics, communications, and humanities. This liberal arts core is a common experience to all majors, and provides the basis for a broadly educated individual. In addition, all students majoring in the disciplines contained within the Business Administration and Accounting Department are required to complete BA 151, Introduction to Management and Entrepreneurship. The **second tier** 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 **third tier** of basic educational skills relates to the fields of financial and managerial accounting. A rigorous thirty-three credit hours are devoted to current accounting theory and applications through the use of texts, computer applications, cases, and practical experience. The sequence begins with introductory level accounting and progresses through intermediate, tax, cost, auditing, and accounting information systems. A **fourth tier** is available for students interested in gaining practical experience through an accounting internship. Most students are placed with public accounting firms where it is possible to experience many areas of accounting as well as a broad range of business problems in a short time-span. Additionally, for students with a more specialized interest, accounting internships are also available in banks, private industry, and with the government. The Wilkes internship program is the oldest in Northeast Pennsylvania and most successful interns have been placed in positions of their choice, including the large international accounting firms. A new **fifth tier,** a five-year BS/MBA program, is available for students who wish

to meet the needs of a professional in the 21st century. This program offered b the Business Administration and Accounting Department has been developed t encompass each of the above-mentioned levels, along with an additional calend year of graduate course work. Upon successful completion, the student wi have earned a Bachelor of Science degree in Accounting and a Master of Busines Administration degree with 150 credit hours of course work.

Students from other disciplines, even those unrelated to business or eco nomics, have been inclined to select an **accounting minor** to enhance their major field of study. The minor provides the student with enough background to begin with professional entry-level employment while developing a back ground in his or her chosen field of study. The minor program is composed of Acc 101-102, Acc 203, and nine additional credits in accounting.

Accounting alumni can be found in public accounting firms ranging in size from those of individual practitioners to international organizations. Many of our graduates who began their careers in public accounting have since moved into leadership positions with government or private industry. The accounting major in the Business Administration and Accounting Department 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 or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
CS 115 Computers and App.	3	COM 101 Public Speaking or	3
BA 151 Introduction to Management and Entrepreneurship	3	COM 206 Business & Prof. Speaking	
Distribution Requirements	3	Distribution Requirements	6
Mth 107 Business Mathematics	3	Acc 101 Financial Accounting	3
PE 100 Activity	0	PE 100 Activity	0
	15-16		15-16
Third Semester		**Fourth Semester**	
Acc 102 Managerial Accounting	3	Acc 203 Intermediate Accounting I	3
Ec 101 Economics I (Core Course)	3	Ec 102 Economics II (Core Course)	3
BA 234 Business Law	3	Distribution Requirements	9
Distribution Requirements	6		15
	15		
Fifth Semester		**Sixth Semester**	
Acc 204 Intermediate Accounting II	3	Acc 205 Intermediate Accounting III	3
Acc 321 Taxes	3	Acc 322 Advanced Taxes	3
BA 319 Business Statistics	3	BA 321 Marketing	3
BA 351 Management of Organizations	3	BA 341 Managerial Finance	3
Free Elective	3	BA 352 Prod/Operations Mgmt.	3
	15		15

Seventh Semester		Eighth Semester	
Acc 301 Advanced Accounting	3	Acc 311 Mgmt. Accounting II	3
Acc 331 Auditing	3	Acc 341 Accounting Info Systems	3
Acc 351 Senior Seminar	3	Acc 361 Internship or	
BA 358 International Business Seminar	3	Free Electives	6
BA 360 Business Policy	3	BA 354 Organizational Behavior	3
	15		15

Recommended Course Sequence for A Major in Accounting (B.S. Degree) and a Master of Business Administration Degree (Five Year Program)

1st Semester		2nd Semester	
Eng 101 Composition or	4	Acc 101 Financial Acc	3
Distribution Requirements	3	Eng 101 Composition or	4
CS 115 Computers and App.	3	Distribution Requirements	3
Mth 107 Business Mathematics	3	COM 101 Public Speaking	3
Distribution Requirements	3	Distribution Requirements	6
BA 151 Intro to Management and Entrepreneurship	3	PE 100 Activity	0
PE 100 Activity	0		15-16
	15-16		
3rd Semester		**4th Semester**	
Acc 102 Managerial Acc	3	Acc 203 Intermediate Acc I	3
Ec 101 Econ I (Core Course)	3	Ec 102 Econ II (Core Course)	3
BA 234 Bus Law and Ethics	3	Distribution Requirements	9
Distribution Requirements	6		15
	15		
5th Semester		**6th Semester**	
Acc 204 Intermediate II	3	Acc 205 Intermediate III	3
Acc 321 Taxes	3	Acc 322 Advanced Taxes	3
BA 319 Business Statistics	3	BA 321 Marketing	3
BA 351 Mgmt of Organizations	3	BA 341 Managerial Finance	3
Free Elective	3	BA 352 Prod/Operations Mgmt	3
	15		15
7th Semster		**8th Semester**	
Acc 301 Advanced Accounting	3	Acc 311 Mgmt Acc II*	3
Acc 331 Auditing*	3	Acc 341 Accounting Info Sys	3
Acc 351 Senior Seminar	3	Acc 361 Internship or	
BA 358 Int'l Bus Seminar	3	Free Electives	6
BA 360 Business Policy	3	BA 354 Organizational Behavior	3
	15		15

MASTER IN BUSINESS ADMINISTRATION
(Total 30 Credit Hours)*

9th Semester		10th Semester	
MBA 532 Managerial Economics	3	MBA 513 Decision Sciences II	3
MBA 512 Decision Sciences I	3	MBA 540 Financial Management	3
MBA 520 Marketing Management	3	MBA 580 Business Issues in a Dynamic Environment	3
MBA 552 Org Behavior & Leadership	3	MBA 590 Strategic Management	3
MBA 563 Acc Policies & Practices	3	MBA 564 Adv Management Acc	3
	15		15

TOTAL PROGRAM CREDIT HOURS – 150

*Senior accounting majors are required to take Acc 331 and Acc 311 in order to receive a BS in Accounting. Those seniors opting for the 5-year program will enroll in Acc 331 and Acc 311 and will do additional academic work equivalent to the graduate level. Upon acceptance into the graduate program these two cross-listed courses will be placed on the student's graduate transcript as MBA 563 and MBA 564 and will serve as a bridge between the undergraduate and graduate programs. This program will satisfy the requirements for an MBA degree without a concentration. If a student wants a concentration **other than** accounting, an additional elective graduate course will be required.

ACC 101. INTRODUCTORY FINANCIAL ACCOUNTING **Three credits**
Introduction to the accounting system and the applicable accounting principles and practices used by accountants and managers in decision making, planning, control, and preparation of financial reports.
Prerequisite: CS 115.

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 203. INTERMEDIATE ACCOUNTING I **Three credits**
A study of the financial accounting and reporting system. Emphasis is placed on how basic standards and procedures relate to the accounting system as a whole. The course topics include an understanding of accounting information systems, summarizing techniques, spreadsheet procedures, extensive computer applications, and financial statement preparation based on current accounting concepts, standards, and principles.
Prerequisite: Acc 101.

ACC 204. INTERMEDIATE ACCOUNTING II **Three credits**
A study of the accounting standards applicable to all the corporate balance sheet accounts and their related counterparts that result in revenue and expense recognition on the income statement and statement of retained earnings. Included in this study will be a complete analysis and review of cash and receivables, inventories and cost of goods sold, plant and depreciation, intangibles and amortization, current and long-term liabilities, and stockholders' equity. Each category reviewed will include conceptual considerations, technical account procedures, and the necessary and appropriate disclosure within the body of the financial statements and the related accounting schedules and footnotes.
Prerequisite: Acc 203.

ACC 205. INTERMEDIATE ACCOUNTING III **Three credits**
A study of the application of generally accepted accounting principles to various technical reporting areas within the financial statements. Emphasis is placed on technical standards and the necessary disclosure requirements for these reporting areas. The course topics include dilutive securities, executive compensation plans, earnings per share, corporate investments, and the accounting for income taxes, employee pensions plans, employee postretirement benefits, leases, and accounting changes. The course concludes with a comprehensive review of computer spreadsheets, financial statements preparation, financial statement analysis and interpretation, full disclosure in financial reporting, and the appropriateness of the accounting principles being applied in accounting practice today.
Prerequisite: Acc 204.

ACC 301. ADVANCED FINANCIAL ACCOUNTING **Three credits**
A comprehensive review and analysis of various accounting issues relating to corporate consolidations, partnerships, governmental units, non-profit organizations, estates, trusts, and bankruptcies. Extensive computerized applications are an integral part of this course.
Prerequisite: Acc 205.

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: 205.

ACC 321. TAXES **Three credits**
Introduction to the Internal Revenue Code for individuals and sole-proprietorships. Preparation of individual tax returns based on the current tax law, regulations, and revenue ruling letters. Introduction to tax research using various traditional and electronic reference services.
Prerequisite: Acc 101.

ACC 322. ADVANCED TAXES **Three credits**
Introduction to certain tax laws as they apply to Corporations, S Corporations, and Partnerships. This involves developing a thorough understanding of tax research and how tax planning may help the financial entity to minimize the tax liability.
Prerequisite: Acc 321.

ACC 331. AUDITING **Three credits**
To understand the most important concepts in auditing and how they are used in decision making, evidence accumulation and reporting. This entails understanding the concepts, methods and processes of control that provide for the accuracy and integrity of financial data and the safeguarding of business assets; along with understanding the nature of attest services and the conceptual and procedural bases for performing them.
Prerequisite: Acc 205.

ACC 341. FINANCIAL AND MANAGERIAL ACCOUNTING SYSTEMS **Three credits**
To develop a solid understanding of and appreciation for the use of accounting information employed to process and sort business events so as to provide information for the functions of financial reporting, internal responsibility accounting and decision support. This understanding includes applications via spreadsheets, databases, general ledgers, and the internet.
Prerequisite: Acc 205.

ACC 351. SENIOR SEMINAR IN FINANCIAL ACCOUNTING **Three credits**
To develop an understanding of the accounting system and its impact on the public and private sectors by bridging the student's knowledge of generally accepted accounting principles and

ethics with financial and non-financial decision making. Team oriented concepts and strategi
are further developed through case work analysis and presentation.

Prerequisite: Acc 205.

ACC 361. ACCOUNTING INTERNSHIP **Three or six credi**

To provide on-the-job accounting experience for accounting majors through a minimum of 17
(3 credits) or 340 (6 credits) hours working experience with either certified public accounting
firms, governmental agencies, or private businesses. Internships are offered on a competitive
basis following student interviews with interested employers. Students not obtaining an internshi
may substitute 6 credits of free electives. (All courses listed through the seventh semester should
be taken prior to this course.)

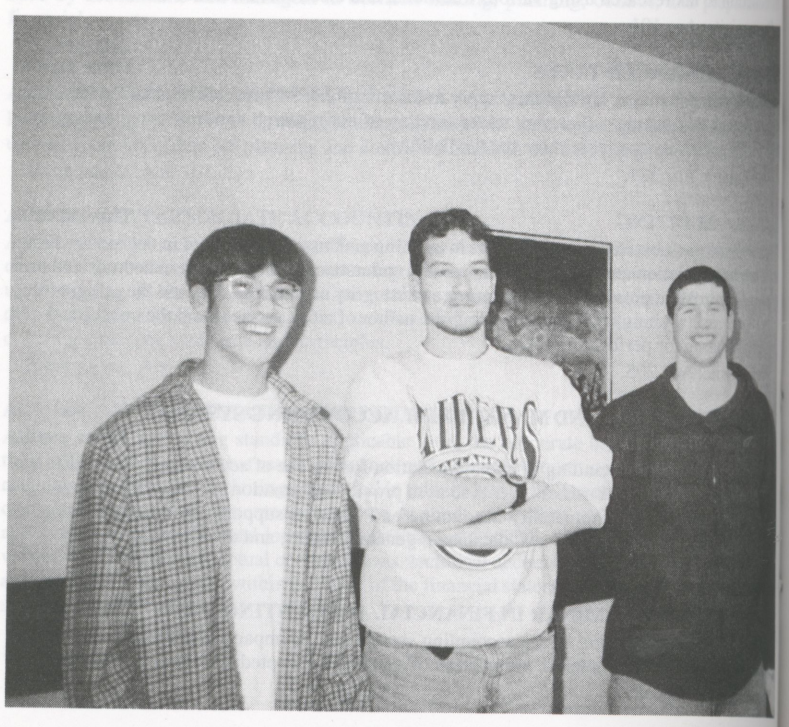
Prerequisite: Acc 205.

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

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

ACC 198/298/398. TOPICS **Variable credi**

Special offerings designed to introduce students to subjects of current interest in accounting which
are not covered in other courses.



AEROSPACE

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

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

Recommended Course Sequence for Aerospace Engineering

First Semester		Second Semester	
Chm 115 Elements and Compounds	4	MaE 200 Materials Engineering	3
Mth 111 Calculus 1	4	Mth 112 Calculus II	4
Egr 111 Introduction to Engineering	3	EE 144 FORTRAN or	3
ME 180 CADD Lab	1	EE 145 Computer Science I	4
Eng 101 Composition	4	Phy 201 General Physics I	4
PE 100 Activity	0	Distribution Requirement	3
		PE 100 Activity	0
	16		17-18

Third Semester		Fourth Semester	
EE 211 Circuit Theory I	3	ME 211 Introduction to Manufacturing	4
EE 283 Electrical Measurements Lab	1	ME 232 Strength of Materials	3
ME 231 Statics & Dynamics	3	ME 234 Statics and Dynamics II	3
Mth 211 Intro. to Differential Equations	4	ME 322 Engineering Thermodynamics	3
Phy 202 General Physics II	4	MaE 284 Engineering Measurements Lab	1
Distribution Requirement	3	Distribution Requirement	3
	18		17

AEROSPACE STUDIES (Air Force ROTC)

Lieutenant Colonel Papp, Chairperson; Assistant Professors Captain Bangert, Major Myers, Major Palmer.

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

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). A minor in Aerospace Studies is available to students who complete a minimum of 22 semester hours including: up to 16 hours of Aerospace Studies courses (AS 101, 102, 201, 202, 301, 302, 401, 402 and 3 hours for AFROTC Field Training AS 240, 4-week AFROTC Field Training; AS 250, 5-week AFROTC Field Training) and a minimum of 3 credit hours within one area listed below. This area should explore a discipline other than the student's major.

Additional courses required in the minor, by concentration:

History: 101, 102, 207, 208, 328, 334, 335, 376.

Political Science: 111, 131, 141, 211, 213, 221, 253, 261, 331, 332, 335.

Business Administration: 101, 212, 233, 234, 321, 326, 327, 341, 351, 352, 353, 354, 356, 357.

Communication: 101, 102, 201, 202, 206, 220, 303, 352, 361, 399.

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. Students enrolling in these courses do not incure any military service obligation. (Exception: Air Force scholarship recipients incur a commitment at the beginning of their sophomore year.) 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 $150-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

meeting certain academic standards. Four-year cadets must complete a four-week field training program; two-year applicants must complete a six-week field training program, both of which are administered the summer before POC entry. In addition, all POC cadets must complete a course in mathematical reasoning prior to being commissioned.

Field Training

Field training consists of a four-week, 3-credit Aerospace Studies Course or a 5-week, 3-credit Aerospace Studies Course conducted at selected Air Force bases. It provides students an opportunity to observe Air Force units and people at work and at home; to participate in marksmanship, survival, athletics, and leadership training activities; to experience aircraft orientation flights; and to 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.

Advanced Training Program (ATP) (Optional)

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

Uniforms

All uniforms, equipment, and textbooks for AFROTC are supplied by the U.S. Air Force. All new cadets are required to pay a nominal initial deposit which will be refunded when the cadet returns all uniform items in satisfactory condition at the completion (or withdrawal from) the AFROTC program.

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, regardless of financial need, with most scholarship recipients determined by central selection boards. 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 in the Fall semester, High school students wishing to compete for AFROTC college scholarships must complete and submit an application early in the fall term of their senior year. ALL AFROTC SCHOLARSHIP RECIPIENTS ENTERING (OR TRANSFERRING TO) WILKES UNIVERSITY RECEIVE **FREE** ROOM AND BOARD. (To receive free room and board, the scholarship recipient must live in a Wilkes University owned and operated residence hall.)

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, engineers, missile or space operations officers, nurses, engineers, 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. Student enrolling in these courses do not incur any military service obligation (Exception: Air Force scholarship recipients incur a commitment at the beginning of their sophomore year.) Course credit value are shown with each course.

First Semester		Second Semester	
AS 101 Foundations of the USAF I	1	AS 102 Foundations of the USAF II	1
AS 103 Leadership Laboratory	0	AS 104 Leadership Laboratory	0
	1		1
Third Semester		**Fourth Semester**	
AS 201 Evolution of USAF Air and Space Power I	1	AS 202 Evolution of USAF Air and Space Power II	1
AS 203 Leadership Laboratory	0	AS 204 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 courses (our "dual-enrollee" program). Students who have not taken any GMC courses and have at least two years remaining until graduation may still apply for entry into the POC, but must apply early in their sophomore year.

Summer Field Training

4-Week AFROTC Field Training		5-Week AFROTC Field Training	
AS 240 4-week AFROTC field Training	3	AS 250 5-week AFROTC Field Training	3

Professional Officer Course (POC) — Consists of four three-credit courses open to students who have at least two full-time years of college remaining. Cadets enrolled in the POC receive $150 per month and have a military service obligation. Course credit values are shown with each course.

Fifth Semester		Sixth Semester	
AS 301 Air Force Leadership Studies I	3	AS 302 Air Force Leadership Studies II	3
AS 303 Leadership Laboratory	0	AS 304 Leadership Laboratory	0
	3		3
Seventh Semester		**Eighth Semester**	
AS 401 National Security Affairs: Preparation for Active Duty I	3	AS 402 National Security Affairs: Preparation for Active Duty II	3
AS 403 Leadership Laboratory	0	AS 404 Leadership Laboratory	0
	3		3

AS 103/104/203/204/303/304/403/404, Leadership LABORATORY, is mandatory for **all** cadets who enroll in AFROTC and must be taken concurrently with each Aerospace study course.

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 roles, organization, missions, and historical development of U.S. air power. Students enrolled in the GMC who are **not** receiving Air Force scholarships incur **no** military obligations. **Note: AS 103-104-203-204 may be substituted for PE 100 series.**

AS 103/104/203/204. LEADERSHIP LABORATORY — **No credit**
Involves a progression of experience designed to develop each student's leadership potential in a supervised training laboratory. Examines U.S. Air Force customs and courtesies, drill and ceremonies, career opportunities, life and work of an Air Force company grade officer.

AS 101. FOUNDATIONS OF THE USAF I — **Fall — One credit**
Introduction to the background, missions, and functions of U.S. military forces, with emphasis on U.S. Air Force organization, command structure and the mission and organization of various major commands. Development of individual communications skills.

AS 102. FOUNDATIONS OF THE USAF II — **Spring — One credit**
Introduction to USAF professions, geopolitics, U.S. defense policy/strategy, U.S. general purpose military forces, insurgency/counter-insurgency, aerospace support forces and organization of other military sevices. Development of individual communications skills.

AS 201. EVOLUTION OF USAF AIR AND SPACE POWER I — **Fall — One credit**
A study of air power development in historical perspective through the end of World War II; including the evolution of missions, concepts, doctrine, and force employment, with emphasis on changes in conflict and factors which have prompted technological developments. Development of individual communications skills.

AS 202. EVOLUTION OF USAF AIR AND SPACE POWER II — **Spring — One credit**
A study of traits of effective leaders and followers coupled with characteristics and values important to the U.S. Air Force. Definition, history and basic concepts of Total Quality Management (TQM) principles used in the Air Force. Application of oral presentation skills.
Prerequisite: AS 201 or permission of instructor.

AFROTC Field Training

AS 240. AFROTC Field Training (4-Weeks) — **Summer — Three credits**
Intensive study of military education, experience in leadership and management at an active duty installation. Also training in marksmanship, survival, and athletics.
Prerequisite: AS 101, 102, 201, 202 and an interview by Professor of Aerospace Studies.

AS 250. AFROTC Field Training (5-Weeks) **Summer — Three credits**
Intensive study of military education, experience in leadership and management at an active duty installation. Also training in marksmanship, survival, and athletics.
Prerequisite: Interview by Professor of Aerospace Studies.

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 a U.S. Air Force officer. The POC concentrates on concepts and practices of management and leadership, national defense policy, and communicative skills.

AS 303/304/403/404. LEADERSHIP LABORATORY **No credit**
Involves a progression of experience designed to develop each student's leadership potential in a supervised training laboratory. Examines U.S. Air Force customs and courtesies, drill and ceremonies, career opportunities, life and work of an Air Force company grade officer.

AS 301. AIR FORCE LEADERSHIP STUDIES I **Fall — Three credits**
General theory and practice of management with special reference to the U.S. Air Force. Covers evolution of management thought, including classical, behavioral, and management science schools; 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 and Total Quality Management (TQM) principles. **Note: AFROTC cadets may substitute AS 301 for BA 351.**
Prerequisite: AFROTC approved membership in the POC or permission of instructer.

AS 302. AIR FORCE LEADERSHIP STUDIES II **Spring — Three credits**
Quality leadership tools and theory: practical experience in influencing people, individually and in groups, to accomplish organizational missions effectively; development of communications skills.
Prerequisite: AS 301 or permission of instructor.

AS 401. NATIONAL SECURITY AFFAIRS/ PREPARATION FOR ACTIVE DUTY 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 Commonwealth of Independent States on U.S. national security policy. Development of individual communications skills. **Note: AFROTC cadets may substitute AS 401 for PS 398 with Social Science and Communications Department approval.**
Prerequisite: AFROTC approved membership in the POC or permission of instructor.

AS 402. NATIONAL SECURITY AFFAIRS/ PREPARATION FOR ACTIVE DUTY 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 401 or permission of instructor.

ANTHROPOLOGY

Professor Baldino, Chairperson; Professor Merryman.

The Department of Social Sciences and Communications 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. 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 50 in Bulletin for placement procedures.)

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

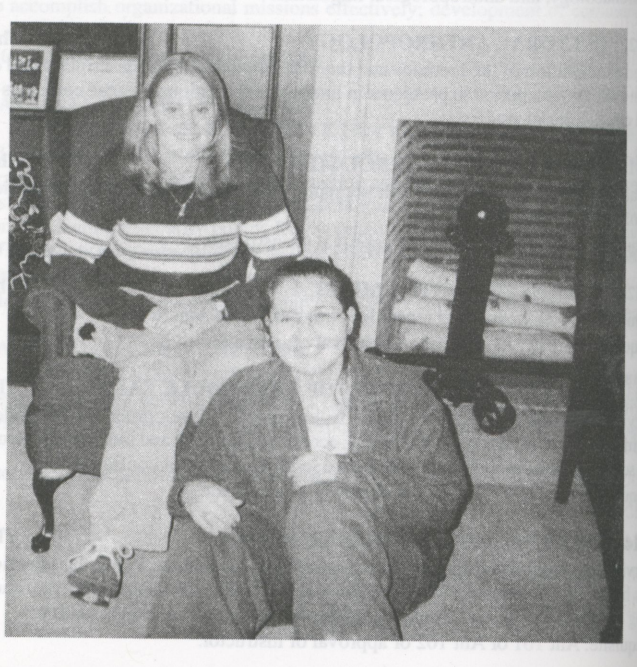
ANT 491. SEMINAR — **Three credits**

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 Maxwell, Chairperson; Professor Arora, Associate Professors Gilmer, Srinivasan; 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 – 120.

The Engineering and Physics 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.

Cooperative education provides applied professional training to Wilkes engineering students that is often valued by prospective employers. The applied and engineering science curriculum includes an optional twelve-credit cooperative education assignment in the sixth semester. Ordinarily, this assignment will continue into the summer preceding the seventh semester. Since all students may not be willing or able to elect such a cooperative educational assignment, the following options exist: [1] The student may complete six credits of technical electives and six credits of free electives. [2] The student may secure a six-credit co-op assignment and complete three credits of technical elective and three credits of free electives.

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 70 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 student's advisor. 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 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

Eng 101 Composition	4
ME 180 CADD Lab	1
Mth 105 Introduction to Calculus I or 111 Calculus I	4
Distribution Requirement	3
EGR 111 Introduction to Engineering	3
PE 100 Activity	0
	15

Second Semester

MaE Materials Engineering	3
Mth 106 Introduction to Calculus II or 111 Calculus II	4
Distribution Requirement	6
Computer Science Elective	3
PE 100 Activity	0
	16

Third Semester

Chm 115 Elements and Compounds	4
Phy 171 Classical and Modern or 201 Physics I	4
Distribution Requirement	3
Free Elective	3
	14

Fourth Semester

Chm 118 Chemistry for Engineers	3
Phy 174 Classical and Modern or 202 Physics II	4
Distribution Requirement	3
Free Elective	6
	16

Fifth Semester

E.E. 283 Electrical Measurements Lab.	1
ME 231 Statics & Dynamics	3
EE 211 Circuit Theory I	3
Distribution Requirement	3
Free Elective	7
	17

Sixth Semester

EE 399 Cooperative Education *or*	12
EE 399 Cooperative Education	6
Technical Elective	3
Free Elective *or*	3
Technical Elective	6
Free Elective	6
	12

Seventh Semester

EE 391 Senior Project I*	1
Science & Engineering Electives	6
Distribution Requirement	6
Free Elective	3
	16

Eighth Semester

EE 392 Senior Project II*	2
Science & Engineering Electives	9
Distribution Requirement	3
	14

*EE 391 and 392 can be replaced by EgM/ENV/ME 391 and 392 depending on the student's concentration. The Science & Engineering 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 twelve credits in Heritage & Value, three in Artistic Expression, and six in Society & Human Behavior, selected to satisfy the distribution requirements.



ART

Adjunct Professor Harrington, Chairperson; Professor Emeritus Simon; Professor Fuller; Associate Professor Bowar; Assistant Professor Grand; Adjunct Faculty Adams, Conway, Dente.

Total minimum number of credits required for a minor in Studio Art — 18.

Total minimum number of credits required for a minor in Art History — 18.

The minor in **Art History** requires that students take ART 140, 14 240, 249 and 6 credits of art history topics courses.

The minor in **Studio Art** accepts any courses above the 101 level, wi no more than 6 credits in art history.

ART 101. EXPERIENCING ART I Three credi

Lectures and discussion on the elements of art and the forerunners of modern and contempora art. Two and three dimensional studio work is explored through the creative process in a varie of media.

ART 110. STUDIO SKILLS One cred

This course provides art students with an introduction to basic materials, tools, and techniqu with which artists should be familiar, over and above those covered in specific disciplines. Stu dents will keep a notebook suitable for future reference. Required for all art majors, preferably i their freshman year. Offered each fall semester.

ART 111. FUNDAMENTALS OF COLOR AND DESIGN I Three credi

A fundamental course for all art majors involving the basic elements and principles of design an the study of color systems including their physical, psychological, and sociological properties.

ART 112. THREE DIMENSIONAL DESIGN Three credi

An introductory course in understanding and manipulating form in three dimensions. Studen will do a series of space and form projects emphasizing design and employing such materials a paper, wire, sand, plaster, clay, and wood.

ART 113. DRAWING AND COMPOSITION Three credi

An introductory course exploring the organization and potential of line, space, and texture throug a variety of media and subject matter.

ART 120. PAINTING I Three credi

An introduction to painting methods, techniques, and materials. Emphasis on the organization o composition and painting techniques.

ART 121. PRINTMAKING I Three credi

An introduction of relief, intaglio, and planographic techniques including block printing, etching lithography, and silk screen.

ART 122. SCULPTURE I Three credi

An introductory course into the basic concepts of three dimensional form and space. Modeling i clay from life; casting and direct building techniques in plaster; basic carving experiences i stone and wood. Fee: $25.

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: $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 134. COMPUTER GRAPHICS I **Three credits**

The Macintosh computer and QuarkXPress will be used to solve graphic design problems. Typographic principles, production techniques and printing processes will be discussed to familiarize students with terminology and procedures. Fee: $25.

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 111 or permission of instructor.

ART 213. LIFE DRAWING **Three credits**

The development of drawing skills using the live model. Fee: $25.
Prerequisite: Art 113 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 120 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 121 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 122 or permission of instructor.

ART 223. CERAMICS II Three cre

Advanced work in both hand-built and wheel-thrown ceramics. Fee: $25.

Prerequisite: Art 123 or permission of instructor.ART 224. SURFACE DESIGN II Th credits

ART 224. SURFACE DESIGN II Three cre

This course will examine historical and multi-cultural textiles in which the surface abounds w pattern, color and embellishments. Students will have opportunities to create dyed textiles a pattern surfaces using a variety of dye-resist techniques. Fee: $25.

Prerequisite: Art 124 or permission of instructor.

ART 233. PHOTOGRAPHY II Three cre

Advanced work in black and white photography, including the zone system; refined darkroo techniques and development of a personal style. Fee: $25.

Prerequisite: Art 133 or permission of instructor.

ART 234. COMPUTER GRAPHICS II Three cre

A continuation of Graphic Design I, emphasizing Adobe Illustrator and Adobe Photoshop t solving visual problems. Scanning images, importing images, and techniques for sending files printers will be covered. The printing process will be discussed at length to familiarize studen with terminology and procedures. Fee: $25.

Prerequisite: Art 134 or permission of instructor

ART 235. GRAPHIC DESIGN I Three cre

Familiarization with the tools, design elements, and production processes of the graphic arts The value and contribution of the graphic arts to society will be discussed. Students will expe ence methods and techniques currently being practiced in the graphic design field. Fee: $25

ART 240. MODERN ART AND DESIGN Three cre

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

ART 249. ART THEORY Three cre

Theoretical aspects of art, its creation and its reception will include aesthetics, historiography an criticism. Format will emphasize viewing, discussing, and writing about art.

ART 335. GRAPHIC DESIGN II Three cre

A continuation of Art 235 with emphasis on publication design. The course will provide oppo tunities for students to design page layouts, catalogues, small books and other printed materia using the computer as a design tool.

Prerequisite: Art 235 or permission of instructor.

ART 395-396. INDEPENDENT RESEARCH One to three cre

Independent study and research for advanced students in the field of the major under the direct 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 50 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.

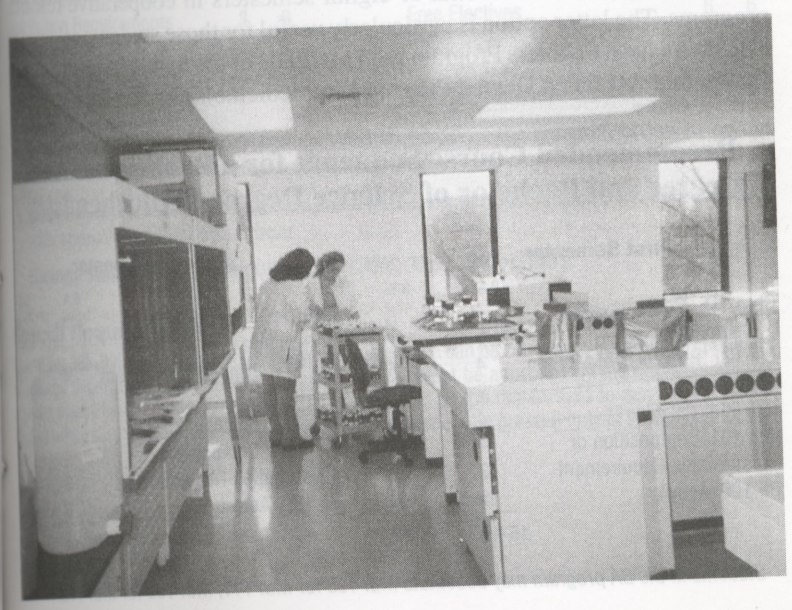
ART 490. ADVANCED PROBLEMS IN STUDIO One to six credits

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 12 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 Turoczi, Chairperson; Professors Emeriti Bohning, Rozelle, Salley, Swain; Professors Faut, Redmond, Stine; Associate Professors Van Der Sluys, Wignot; Assistant Professor Kiessling; Laboratory Manager Bianco; Adjunct Professor Gregorek; Adjunct Associate Professor Phillips.

Total minimum number of credits required for a major in Biochemistry leading to the B.S. degree – 126.

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

The Biochemistry curriculum is designed to provide comprehensive backgrou education and training for those students interested in this interdisciplinary ar

The B.S. curriculum meets the liberal arts requirements of the univers with a concentration in advanced courses. It was developed for those stude who wish to prepare for Biochemistry as a professional option. Holders this degree seek employment directly in the field or they can pursue advanc degrees in graduate school.

The B.A. degree was developed for those students interested in Biochem try as a means of preparation for entrance into health science professio schools, such as allopathic, osteopathic, and podiatric medicine, dental me cine, optometry, etc. Two specific features of the program are that students may pursue the first three years of the biochemistry degree curriculum in t three year option under the Philadelphia College of Osteopathic Medicine Wilkes University combined seven year medical and baccalaureate deg program or (2) use the seventh or eighth semesters in cooperative resea programs. The latter option is particularly useful for those students selected The Premedical Scholars Program with MCPHU or the SUNY Health Scien Center (see Affiliated Degree Programs in Medicine).

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

First Semester

	B.A.	B.S.
Chm 115 Elements and Compounds	4	4
Bio 121 Principles of Modern Biology I	4	4
Mth 111 Calculus I*	4	4
Eng 101 Composition or Distribution Requirement	4	4
PE 100 Activity	3	3
	0	0
	15-16	15-16

Second Semester

	B.A.	B.S.
Chm 116 The Chemical Reaction	4	4
Bio 122 Principles of Modern Biology II	4	4
Mth 112 Calculus II*	4	4
Eng 101 Composition or Distribution Requirement	4	4
PE 100 Activity	3	3
	0	0
	15-16	15-16

** Students in the BA program may substitute Mth 105 for Mth 111, Mth 106 for Mth 112.*

Third Semester

	B.A.	B.S.
Chm 231 Organic Chemistry I	4	4
Phy 201 General Physics I*	4	4
Mth 211 Intro. Linear Algebra and Differential Equations	0	4
Distribution Requirement	3	0
CS Elective	3	3
	14	15

Fourth Semester

	B.A.	B.S.
Chm 232 Organic Chemistry II	4	4
Phy 202 General Physics II*	4	4
Bio 226 Cellular and Molecular Biology	4	4
Distribution Requirement	3	3
Free Elective	3	3
	18	18

** Students in the BA program may substitute Phy 171 for Phy 201, Phy 174, for Phy 202.*

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	3	3
Chm 254 Physical Chemistry II Lab	0	1
Chm 362 Biochemistry II	3	3
Distribution Requirements	9	6
	17	15

Seventh Semester

	B.A.	B.S.
Chm 342 Instrumental Analysis	3	3
Major Electives	3	3
Chm 391 Senior Research I*	1	1
Distribution Requirements	3	9
Free Electives	3	0
	13	16

Eighth Semester

	B.A.	B.S.
Chm 392 Senior Research II*	2	2
Distribution Requirements	3	3
Major Electives	3	3
Free Electives	6	6
	14	14

* BIO 391-392 may be substituted with approval of the research proposal by the advisor and permission of the department chairs.

Major Electives: May be selected from Mth 212, Chm 222, 272, 323, 346 or others with approval of the department.

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

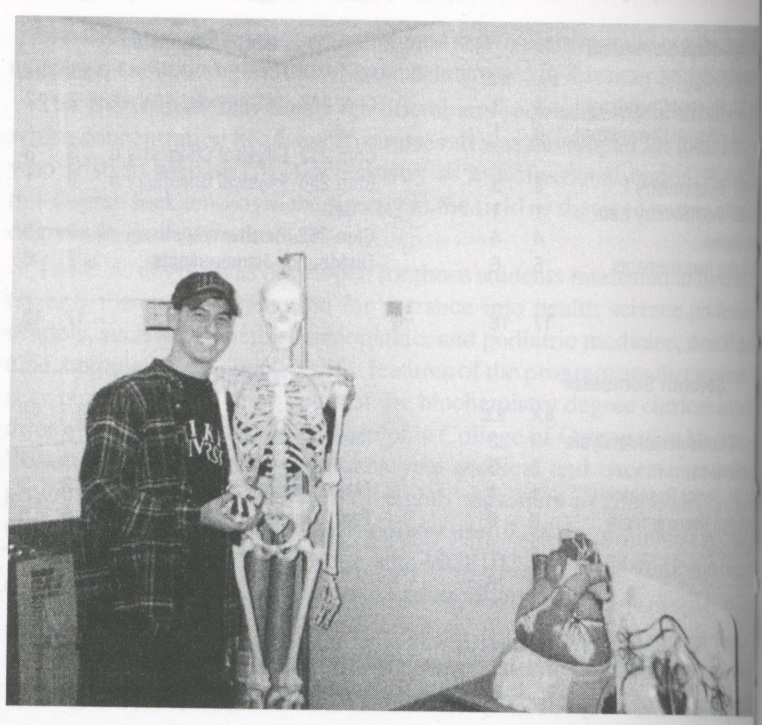
Special Requirements

Chemistry 391-392 are laboratory research courses, which can be completed in either the chemistry or biology departments. 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.

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

All upper division Biochemistry 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; Professor Klemow; Associate Professors Hayes, Kalter, Pidcock, Steele; Assistant Professors Terzaghi; Adjunct Faculty Chapman; Laboratory Preparations Specialist, Zayleskie.

Total minimum number of credits required for a major in Biology leading to the B.A. degree – 122.

Total minimum number of credits required for a major in Biology leading to the B.S. degree – 122.

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, Chemistry, and Health Sciences 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 a total of four electives with one upper-level course from each of the four categories. The B.S. major must take a total of five electives with one upper-level course from each of the four categories and additionally select any one course from those same categories.

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 300 Behavior of Marine Organisms
MS 330 Tropical Invertebrates
MS 331 Chemical Oceanography
MS 342 Marine Biology
MS 343 Marine Ichthyology
MS 345 Ornithology
MS 362 Marine Geology
MS 394 Physiology of Marine Organisms
MS 431 Ecology of Marine Plankton
MS 432 Marine Evolutionary Ecology
MS 450 Coastal Geomorphology
MS 464 Biological Oceanography
MS 470 Research Diver Methods
MS 491 Coral Reef Ecology
MS 492 Marine Mammals
MS 493 Behavioral Ecology
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 or	4	4
Distribution Requirement	3	3
Mth 105 Calculus for Life, Managerial, and Social Sciences I or Mth 111 Calculus I	4	4
	15-16	15-16

Second Semester

	B.A.	B.S.
Bio 122 Principles of Modern Biology II	4	4
Chm 116 The Chemical Reaction	4	4
Eng 101 Composition or	4	4
Distribution Requirement	3	3
Mth 106 Calculus for Life, Managerial, and Social Sciences II or Mth 112 Calculus II	4	4
	15-16	15-16

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 Professional Preparation Techniques*	2	2
Bio Elective/Research	3	3
Phy 171 Classical and Modern Physics	4	4
Distribution Requirements	6	3
Free Elective**	3	3
Mth 150 Elementary Statistics	—	3
	18	18

Sixth Semester

	B.A.	B.S.
Bio 397 Professional Preparation Techniques*	2	2
Bio Elective/Research	3	3
Phy 174 Classical and Modern Physics	4	4
Distribution Requirements	3	3
Computer Science Elective	3	3
Free Elective**	3	3
	18	18

Seventh Semester

	B.A.	B.S.
Bio 391 Senior Research Projects	1	1
Bio Electives	3-4	6-8
Distribution Requirements	3	6
Free Electives**	9	3
	16-17	16-18

Eighth Semester

	B.A.	B.S.
Bio 392 Senior Research Projects	2	2
Bio Electives	3-4	6-7
Distribution Requirement	3	3
Free Electives**	7	4
	15-16	15-16

*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.

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. Dissections of specimens are required in the laboratory portion of the course. 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 spring 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. Dissections of specimens are required in the laboratory portion of these courses. 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 biology for students majoring in biology and other sciences. Topics covered include the origin of life, basic biochemistry, cell structure and function, energetics, reproduction and heredity, molecular genetics, and evolution. Four hours of lecture and three hours of laboratory per week. Laboratory fee: $40.

Corequisite: Chm 115.
Offered every fall semester.

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

An introduction to biological diversity and mammalian structure and function for science majors, usually taken as a continuation of BIO 121. Topics include organismal classification, a survey of biological diversity (including characteristics, ecology, phylogenetic relationships, and economic and biomedical uses) of plants, animals and microbes, and an overview of the mammalian body addressing the form and function of key organ systems. Dissections of specimens are required in the laboratory portion of this course. Four hours of lecture, three hours of laboratory per week. Laboratory fee: $40.

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. Four hours of lecture, three hours of laboratory. Required of all biology majors. Laboratory 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. Four hours lectures, three hour of laboratory. Required of all biology majors. 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 credi**

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, Mud Puppy, and Cat in detail. Lecture three hours per week, laboratory three hours per week. Laboratory fee: $40.

Prerequisites: Bio 121-122, 225-226.
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 **Four credits**

This course deals with how the instructions encoded in DNA are used to construct living organisms, and how genetic information is copied and passed on to the next generation. Lectures will cover genome structure and function, regulation of gene expression, DNA, RNA, protein, lipid and carbohydrate synthesis, organelle assembly, cell division and genetic recombination. Laboratories will introduce students to techniques used for genetic engineering. Lecture, three hours; laboratory, three hours per week. Laboratory fee: $40.

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

BIO 325. ENDOCRINOLOGY **Three credits**

This course will focus on the structure, biochemistry, and function of mammalian hormones and endocrine glands, but avian, amphibian and insect hormones will also be discussed where relevant. In addition, clinical pathologies resulting form excess or insufficient hormone production will be discussed, as this is essential to mastering an understanding of Endocrinology. Lecture: three hours.

Prerequisites: Bio 121-122, 225-226, or permission of instructor.
Offered every other Fall 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 in alternate years.

BIO 327. MEDICAL MICROBIOLOGY **Four credits**

Medical Microbiology provides a professional-level introduction to microbiology that is focused on application of microbiology to the study of infectious disease etiology and epidemiology. The laboratory covers techniques used in isolation and identification of microorganisms. Lecture: three hours a week; Laboratory: three hours per week. Laboratory fee: $40.

Prerequisites: Bio 121-122, Chm 231-232

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 331-332. MEDICAL ANATOMY AND PHYSIOLOGY I & II **Four credits each**

In-depth principles of human anatomy and physiology as well as an introduction to pathophysiology will be presented. The emphasis is on human physiology; however, other mammalian systems are discussed to demonstrate physiological adaptability to various environmental situations. Dissections of specimens are required in the laboratory portions of these courses. Lecture: three hours a week; Laboratory/Recitation: three hours a week. Laboratory fee: $40 each. Bio 331 is a pre-requisite for Bio 332.

Prerequisites: Bio 121-122, 225-226, and permission of instructor.
Bio 331 – Offered every Fall Semester; Bio 332 – Offered every Spring Semester.

BIO 338. BIOLOGY OF CANCER **Three credits**

This lecture course is designed to explore the various concepts and mechanisms associated with the origins, elaborations and future developments in cellular transfromation and carcinogenesis. Emphasis is placed on the molecular biology and physiology of these processes; therefore, a solid background in basic biology is required. Oncogenes, tumor suppressor genes and the disruption of homeostasis are covered in detail, while the medical phenomena typically receive a more general level of coverage.

Prerequisites: Bio 121-122, 226; Chm 231-232.
Bio 331 – Offered every Fall Semester; Bio 332 – Offered every Spring Semester.

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 em-

phasized. 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.
Offered in alternate years.

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. PROFESSIONAL PREPARATION TECHNIQUES **Two credits**

Professional Preparation Techniques introduces biology majors to biology as a profession. Students learn how to read, write, and dissect research papers, and how to make oral presentations and posters using electronic and paper-based supplements. Career development issues, including effective presentation of credentials, are also addressed.

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 50 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 introduction 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

Professor Alves, Chairperson; Professor Emeritus Gera; Professor Liuzzo; Associate Professor Batory, Engel, Loftus, O'Hop, Raspen, Stepanovich; Assistant Professor Stepanovich.

Total minimum number of credits required for a Bachelor of Business Administration degree — 121.

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

The Business Administration and Accounting 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. The Association of Collegiate Business Schools and Programs (ACBSP) has accredited both the undergraduate and graduate business administration programs as well as the undergraduate program in accounting. ACBSP accreditation affirms the excellence of our programs to graduate and professional schools as well as potential employers and therefore serves as a major competitive advantage for students completing the business administration major at Wilkes. 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 is the liberal arts General Education Requirements of the University core. This core consists of 49 credits — 4 credits in written expression (English 101), 3 credits in oral expression (Com 101/206), and 42 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; and one additional General Education course, which shall be approved by the Student's advisor and which may not hold the prefix of ACC, BA, or EC — 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. In addition, all Business Administration majors, as well as those majoring in other disciplines contained within the Business Administration and Accounting Department are required to complete BA 151, Introduction to Management and Entrepreneurship.

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 209	Business Correspondence and Reports
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 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 and Decision-Making Seminar
COM 101 / COM 206	Public Speaking or 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 107	Business Mathematics **(Distribution Area II)***

*Meet requirements in the University core.

The third and final tier requires completion of fifteen credits of elective courses within the major. These fifteen credits must be comprised of courses listed in six concentration areas (Finance, Marketing, Business Economics, Health Services Administration, International Business, and Entrepreneurship) and those designated as "Other Electives." Students wishing to satisfy the requirements for a particular concentration area must complete at least nine of their fifteen third-tier credits within that concentration area (See below for a complete description of these concentration areas.)

The Bachelor of Business Administration degree program also contains sixteen 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 two 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 Administration and Accounting

Department offers the minor program in Business Administration with concentrations in Finance, Marketing, Management, International Business, Health Services Administration, Business Economics and Entrepreneurship, as explained below. 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, 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 of our global and diverse environment in the twenty-first century.

Closely linked to the Business Administration and Accounting Department are the Allan P. Kirby Center for Free Enterprise and Entrepreneurship and the Small Business Development Center. 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 151 Introduction to Management and Entrepreneurship	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 101 Composition or Distribution Requirement	4
Eng 101 Composition or Distribution Requirement	3	Mth 107 Business Mathematics **(Dist)**	3
Distribution Requirement	3	Distribution Requirement	3
PE 100 Activity	0	PE 100 Activity	0
	15-16		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	BA 209 Business Correspondence and Reports	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	General Education Elective	3
BA 356 Social Responsibility of Bus.	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 Seminar: International Business Management	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 Elective	3
			12

Bachelor of Business Administration Degree

NOTE: Students who pursue the Bachelor of Business Administration degree must complete 15 credits from any of the concentration areas and the "Other Electives" section shown below. Students who wish to satisfy the requirements for a particular concentration area must complete at least 9 of their 15 credits within that concentration area. Students are not required to satisfy the requirements for a concentration area, but they may choose to do so. Students will receive credit for no more than 2 concentration areas.

CONCENTRATION AREAS

Business Economics

EC 201	Intermediate Macroeconomics	EC 330	Public Finance
EC 202	Intermediate Microeconomics	EC 380	Labor Economics
EC 230	Money and Banking		

Entrepreneurship

BA 281	Nature and Essence of Entrepreneurship	BA 382	Practicing Entrepreneurship
		BA 384	Small Business Consultancy
BA 381	Entrepreneurship Internship		

Finance

ACC 203	Intermediate Accounting I	BA 343	Investments and Portfolio Management
BA 342	Property and Life Insurance	BA 345	Long-Range Financial Planning

Health Services Administration

BA 371	The U.S. Health Care System	BA 373	Performance Improvement in Health Care
BA 372	Management and Financial Control in Health Care	EC 374	Economics of Health Care

International Business

BA 212	Government and Business	EC 310	Economic Development
EC 301	Comparative Economic Systems	EC 340	International Trade and Finance

Marketing

BA 322	Advertising	BA 327	Marketing Seminar
BA 324	Retailing	BA 328	Consumer Behavior
BA 326	The Selling Process	COM 302	Public Relations

Other Electives

BA 234	Business Law	BA 399	Cooperative Education
BA 395-396	Independent Research	EC 315	Business Cycles
BA 198-298-398	Topics	EC 385	Collective Bargaining

BUSINESS ADMINISTRATION MINOR

All students wishing to minor in Business Administration will be required to take eight courses, or twenty-four credits, in business. Five courses are required and three courses are elective. The following five courses are required for all students:

1. EC 102
2. BA 233
3. BA 321
4. BA 341
5. BA 351

In addition to the above five courses, students wishing to minor in Business Administration will be required to take any three courses from any of the Areas of Concentration or Other Electives listed on the previous page. Students who wish to minor in Business Administration and also concentrate in a particular area of business may do so by selecting all three of their courses from the same Area of Concentration. In addition to the Areas of Concentration listed above, students may, if they wish, concentrate in Management by taking three of the following courses:

1. BA 352
2. BA 354
3. BA 356
4. BA 357

BA 151. INTRODUCTION TO MANAGEMENT AND ENTREPRENEURSHIP — **Three credits**

An introduction to business, management, and entrepreneurship. The functional areas of business and managment practices are highlighted using the small business environment as the primary source of examples. The entrepreneurial process is demonstrated throughout the course. Students begin developing competencies in research, communications, and decision-making.

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.

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 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 — **Three credits**

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

BA 281. NATURE AND ESSENCE OF ENTREPRENEURSHIP — **Three credits**

An introduction to entrepreneurs and self-career creation in small and large entrepreneurial organizations. The importance of entrepreneurs in the local, national and world economies and personal characteristics of successful entrepreneurs will be studied. Guest speakers and a case study are included.

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 319.)

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.

Junior/Senior standing recommended.

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 324. 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 326. THE SELLING PROCESS Three credits

Examines the buyer-seller relationship process of marketing products and services to consumers and organizations. Emphasis is placed on sales techniques, presentation styles and sales management skills appropriate to the business interaction.

Prerequisite: BA 321.

BA 327. MARKETING SEMINAR Three credits

In-depth examination of selected issues and problems in marketing. Specific topics alternate depending on student and faculty interests in areas such as marketing strategy formulation, marketing research, new product development, international marketing and sports marketing.

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.

Junior/Senior standing recommended.

BA 342. PROPERTY AND LIFE INSURANCE Three credits

A study of principles of life, health, property, and liability insurance applied to the needs of individuals and organizations

Prerequisite: BA 341.

BA 343. INVESTMENTS AND PORTFOLIO MANAGEMENT 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.

Junior/Senior standing recommended.

BA 345. LONG-RANGE FINANCIAL PLANNING Three credits

A survey of the tools and techniques currently employed by financial decision-makers when evaluating organizational performance and developing future courses of action. Emphasis will be placed upon long-range planning and capital budgeting techniques.

Prerequisites: BA 341 and BA 343.

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 recommended

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 319 and 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.

Junior standing recommended.

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.

Prerequisites: 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. MANAGEMENT AND FINANCIAL CONTROL IN HEALTH CARE Three credits

This course captures the unique aspects of finance and management found in the health care sector. Specifically, the course will address the design and structure of health care organizations; health care organizational dynamics and behavior; reimbursement systems (including indemnity plans, managed care plans, medicare and medicaid); and financial management in not-for-profit organizations.

Prerequisites: BA 341 and BA 351.

BA 373. PERFORMANCE IMPROVEMENT IN HEALTH CARE Three credits

This course introduces the student to measuring and monitoring performance criteria in health care. The course will address such issues as patient satisfaction, outcomes assessment, utilization managment, and applications of continuous improvement technology to health services. The course will also introduce students to the principles of epidemiology and the study of the distribution and determinants of disease in human populations, particularly as they relate to performance measurement in health administration.

Prerequisite: BA 319.

BA 381. ENTREPRENEURIAL INTERNSHIP — **Three credits**

The course content provides on-the-job mult-discipline experience assisting a working local entrepreneur in the development and operation of a business enterprise.

BA 382. PRACTICING ENTREPRENEURSHIP — **Three credits**

Advanced essentials and elements of becoming an entrepreneur, or intrapreneur, will be examined through current classic "real life' entrepreneurial case readings and entrepreneur and guest faculty lectures. Students will create their own entrepreneurial enterprise as a team project.

Prerequisites: Senior standing, BA 281 and BA 381, or permission of instructor.

BA 384. SMALL BUSINESS CONSULTANCY — **Three credits**

Teams of students diagnose, analyze, and recommend solutions for problems defined by small business clients. Course requires students to apply a range of classroom skills in a real situation and present oral and written reports to the client firm.

Prerequisites: Senior standing and instructor permission.

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.

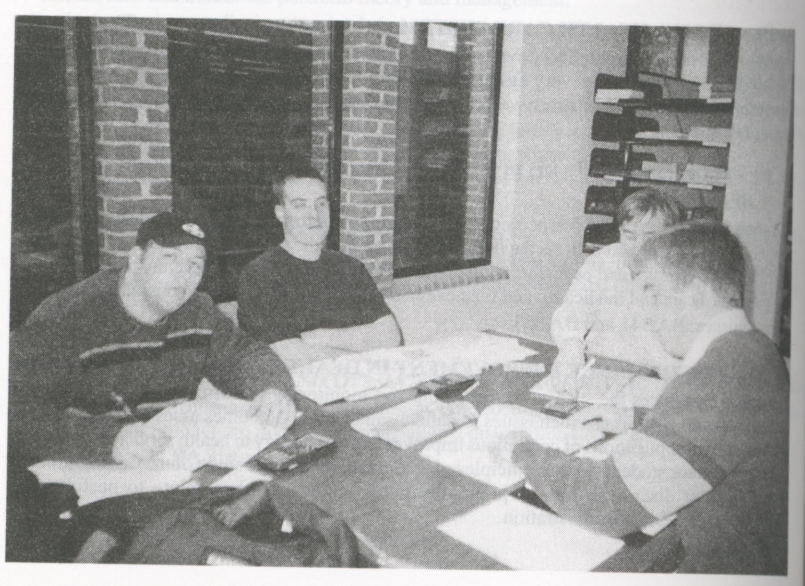
BA 399. COOPERATIVE EDUCATION — **One to six credits**

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 50 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 Case, Klemow, Redmond; Associate Professors S. Halsor, Murthy, Steele; Assistant Professors Troy, Whitman; Adjunct Faculty Hofman, McMonagle, Toothill; Lab Manager Oram; Lab Instructor McMonagle.

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
Egr 111 Introduction to Engineering	3	EE 144 FORTRAN or	3
ME 180 CADD Lab	1	EE 145 Computer Science I	4
Eng 101 Composition or	4	Phy 201 General Physics I	4
Distribution Requirment	3	Eng 101 Composition or	4
PE 100 Activity	0	Distribution Requirement	3
	15-16	PE 100 Activity	0
			17-18

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 Turoczi, Chairperson; Professors Emeriti Bohning, Rozelle, Salley, Swain; Professors Faut, Redmond, Stine; Associate Professors Van Der Sluys, Wignot; Assistant Professor Kiessling; Laboratory Manager Bianco; Adjunct Professor Gregorek; Adjunct Associate Professor Phillips.

Total minimum number of credits required for a major in Chemistry leading to the B.S. degree — 126.

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, etc.), 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 and changes in the order may be made after faculty advisement.

Recommended Course Sequence for a Major in Chemistry

First Semester

	B.A.	B.S.
Chm 115 Elements and Compounds	4	4
Eng 101 Composition or Distribution Requirement	4 / 3	4 / 3
Mth 111 Calculus I*	4	4
Distribution Requirement	3	3
PE 100 Activity	0	0
CS Elective	3	3
	17-18	17-18

Second Semester

	B.A.	B.S.
Chm 116 The Chemical Reaction	4	4
Eng 101 Composition or Distribution Requirement	4 / 3	4 / 3
Mth 112 Calculus II*	4	4
Distribution Requirements	3	3
Free Elective	3	3
PE 100 Activity	0	0
	17-18	17-18

** Students in the BA program may substitute Mth 105 for Mth 111, Mth 106 for Mth 112.*

Third Semester

	B.A.	B.S.
Chm 231 Organic Chemistry I	4	4
Mth 211 Intro. Linear Algebra and Differential Equations	0	4
Distribution Requirement	3	3
Phy 201 General Physics I*	4	4
Free Electives	3	0
	14	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

** Students in the BA program may substitute Phy 171 for Phy 201, Phy 174 for Phy 202.*

Fifth Semester

	B.A.	B.S.
Chm 251 Physical Chemistry I	3	3
Chm 253 Physical Chemistry I Lab	0	1
Chm 272 Chemical Structure Determination	3	3
Major Elective	3	3
Free Electives	3	3
Distribution Requirement	3	3
	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
Distribution Requirements	6	6
	14	15

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
Chm 342 Instrumental Analysis	3	3
Distribution Requirement	3	3
Free Electives	9	6
	16	17

Eighth Semester

	B.A.	B.S.
Chm 392 Senior Research	2	2
Free Electives	6	6
Distribution Requirement	3	3
Major Elective	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 program.

B.S. degree students must elect a minimum of one 300-level course in addition to the 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 in the Education section of this Bulletin as they pertain to chemistry certification. The certification student must take an introductory biology course, must work in the Chemistry program 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.

The Chemistry program 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.

CHM 95. PREPARATION FOR GENERAL CHEMISTRY — **Three credits**

This course is designed to serve the remedial needs of students who require a "preparatory" course to General Chemistry (CHM 115/116, 118). It provides an introduction to and practice with the principles and concepts essential for understanding chemistry. Key topics covered in this course include reviewing basic mathematical tools and improving problem-solving skills. In addition, a discussion of the fundamental chemical laws, the structure of matter, and the periodic table is presented. Finally, the use of chemical formulas to describe various chemical reactions and their stoichiometry is covered. Please note, however, that this course does not satisfy any chemistry requirements in any major.

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 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 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 — **Three 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 **Three credits**
Introduction to ligand field theory; chemistry of the first transition series, organometallic, and π 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 **Three 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 periods per week.
Prerequisite: Chm 251-252.

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.

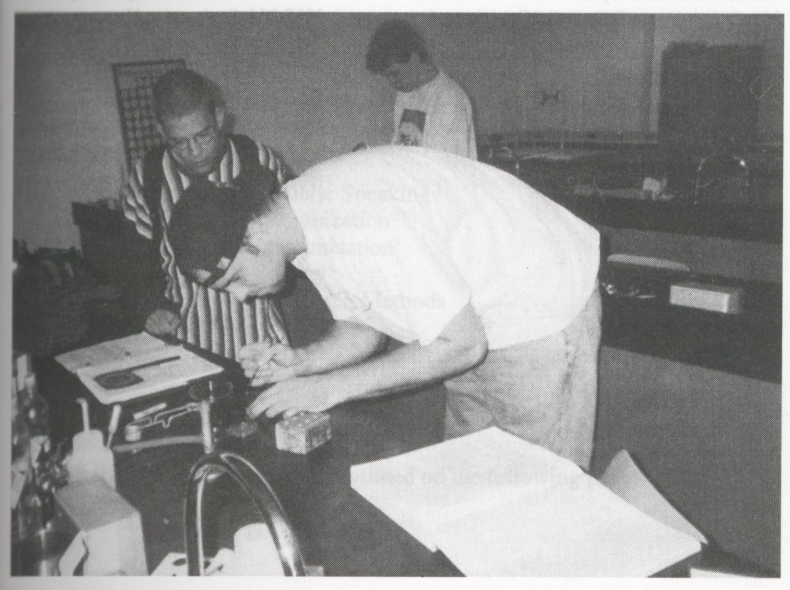
CHM 392. SENIOR RESEARCH II **Two credits**
Students will carry out a chemistry research project under the direction of a faculty member. It is expected the project will be a laboratory research project. The project must culminate in a written report and the results must be presented at a Department 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 50 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 Case, Klemow, Redmond; Associate Professors S. Halsor, Murthy, Steele; Assistant Professors Troy, Whitman; Adjunct Faculty Hofman, McMonagle; Lab Manager Oram; Lab Instructor McMonagle.

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

Chm 115 Elements and Compounds	4
Mth 111 Calculus I	4
Egr 111 Introduction to Engineering	3
ME 180 CADD Lab	1
Eng 101 Composition or	4
Distribution Requirement	3
PE 100 Activity	0
	15-16

Second Semester

Chm 118 Chemistry for Engineers	3
Mth 112 Calculus II	4
EE 144 FORTRAN or	3
EE 145 Computer Science I	4
Phy 201 General Physics I	4
Eng 101 Composition or	4
Distribution Requirement	3
PE 100 Activity	0
	17-18

Third Semester

EE 211 Circuit Theory I	3
EE 283 Electrical Measurements Lab	1
ME 231 Statics & Dynamics	3
Mth 211 Intro. to Differential Equations	4
Phy 202 General Physics II	4
Distribution Requirement	3
	18

Fourth Semester

ME 232 Strength of Materials	3
or 324 Heat and Mass Transfer	
MAE 200 Materials Engineering	3
MAE 284 Engineering Measurements Lab	1
Mth 212 Multivariable Calculus	4
Phy 203 General Physics III	3
Distribution Requirement	3
	17

COMMUNICATIONS

Professor Baldino, Chairperson; Professors Bigler, Kinney; Associate Professors Elmes-Crahall, Jernigan; 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 major in 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 department 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 352 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 its 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 or 7 credits):

Eng 201 Writing About Literature and Culture *or*
Eng 202 Technical Writing 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 Sequence for Organizational Communication and Rhetorical and Public Communication Concentrations

First Semester

Eng 101 Composition or	4
Distribution Requirement	3
COM 101 Fundamentals of Speech	3
Distribution Requirements	9
PE 100 Activity	0
	15-16

Second Semester

Eng 101 Composition or	4
Distribution Requirement	3
COM 102 Principles of Communication	3
Distribution Requirements	9
PE 100 Activity	0
	15-16

Third Semester

COM 202 Interpersonal Communication	3
Concentration Selection	3
Writing Requirement	3
Distribution Requirement	3
Free Elective	3
	15

Fourth Semester

COM 302 Public Relations	3
Concentration Selection	3
Writing Requirement	3
Distribution Requirements	6
	15

Fifth Semester

COM 224 Mass Media	3
Concentration Selections	6
Distribution Requirements	6
	15

Sixth Semester

COM 324 Research Methods	3
Concentration Selection	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

Telecommunications

This concentration introduces students to the history, economics, regula-
tions, and functions of the radio, television and cable industries. It provides
students with a combination of skills, performance, and theory that will en-
able graduates to seek employment in those industries. In addition, students
should be competitive in advertising, marketing, and research firms as well a
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 or 7 credits):

COM 260 Basic Newswriting and
Eng 201 Writing About Literature and Culture *or*
Eng 202 Technical Writing

Recommended Course Sequence for Telecommunications Concentration

First Semester		Second Semester	
Eng 101 Composition or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	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
	15-16		15-16

Third Semester		Fourth Semester	
COM 202 Interpersonal Communication	3	COM 220 Intro. to Telecommunications	3
COM 260 Basic Newswriting	3	Concentration Selection	3
Concentration Selection	3	Eng 201 Advanced Composition	3
Distribution Requirement	3	Distribution Requirements	6
Free Elective	3		
	15		15

Fifth Semester		Sixth Semester	
COM 221 Basic Audio Production	3	COM 222 Basic Video Production	3
COM 224 Mass Media	3	COM 324 Research Methods	3
Distribution Requirements	6	Distribution Requirements	6
Free Elective	3	Free Elective	3
	15		15

Seventh Semester		Eighth Semester	
Concentration Selection	3	COM 397 Senior Seminar	3
Free Electives	12	Free Electives	12
	15		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 361 Feature Writing

Writing Requirement (6 or 7 credits):

COM 260 Basic Newswriting and
Eng 201 Writing About Literature and Culture *or*
Eng 202 Technical Writing

Recommended Course Sequence for Journalism Concentration

First Semester		Second Semester	
Eng 101 Composition or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	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
	15-16		15-16

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:

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

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

Telecommunications Minor

Required: COM 220 Introduction 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

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 advisor 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.

Prerequisite: COM102 or consent of instructor

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 publication 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 352. ADVANCED PUBLIC RELATIONS **Three credits**

COM 352 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 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 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 50 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

Professor Tillman, Chairperson. Professor Emeritus Earl; Associate Professor Emeritus DeCosmo; Professors, Berard, Koch, Merrill, Wong; Associate Professors Lew, Sullivan; Assistant Professors Bracken, Harrison, Kapolka.

Total minimum number of credits required for a major in Computer Information Systems leading to the B.S. degree — 120.

Total minimum number of credits required for a minor in Management Information Systems — 23.

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 principle 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

	credit hours
Required courses:	
CS 125, 215, 224, 324	14
BA 351	3
Any two among:	
BA 352, 354, 356, 357	6
Minimum Total Required	23

Recommended Course Sequence for a Major in Computer Information Systems

First Semester		Second Semester	
Eng 101 Composition or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
CS 125 Computer Science I	4	CS 126 Computer Science II	4
Mth 105 Calculus for Life, Managerial, and Social Sciences I	4	CS 128 UNIX	1
Distribution Requirement	6	Mth 106 Calculus for Life, Managerial, and Social Sciences II	4
PE 100 Activity	0	Distribution Requirements	3
	17-18	PE 100 Activity	0
			15-16
Third Semester		**Fourth Semester**	
CS 215 Intro to Computer Info Systems	3	CS 224 COBOL & File Management	4
Mth 150 Elementary Statistics	3	Eng 202 Technical Writing	3
Acc 101 Intro. Financial Accounting	3	Acc 102 Intro Managerial Accounting	3
Distribution Requirements	6	Science Elective[1]	3
	15	Distribution Requirements	3
			16
Fifth Semester		**Sixth Semester**	
CS 324 Systems Analysis	3	CS 325 Database Management	3
BA 341 Managerial Finance	3	CS 334 Software Engineering	3
BA 351 Management of Organizations	3	CS 355 Computer Networks	3
Science Elective[1]	3	BA 352 Production and Operations Management	3
Distribution Requirement	3	Free Elective	3
	15		15
Seventh Semester		**Eighth Semester**	
CS 391 Senior Projects I	1	CS 392 Senior Projects II	2
CS/Mth Elective[2]	3	CS/Mth Elective[2]	3
Distribution Requirement	3	BA 354 Organizational Behavior or BA 356 The Social Responsibility of Business	3
Free Electives	6	Free Electives	5
	13		13

[1] See below for the Department's requirements regarding science electives.
[2] See below for the Department's requirements regarding CS/Mth electives.

Recommended Course Sequences for a Major in Computer Science

First Semester

	B.A.	B.S.
CS 125 Computer Science I	4	4
PE 100 Activity	0	0
Eng 101 Composition or Distribution Requirement	4	4
Mth 111 Calculus I	3	3
Distribution Requirements	4	4
	3	3
	14-15	14-15

Second Semester

	B.A.	B.S.
CS 126 Computer Science II	4	4
CS 128 UNIX	1	1
PE 100 Activity	0	0
Eng 101 Composition or Distribution Requirement	4	4
Mth 112 Calculus II	3	3
Distribution Requirements	4	4
	3	3
	15-16	15-16

Third Semester

	B.A.	B.S.
CS 230 Machine Language	4	4
Mth 202 Set Theory and Logic	4	4
Science/Science Sequence[1]	3	4
Distribution Requirements	6	6
	17	18

Fourth Semester

	B.A.	B.S.
CS 227 Computer Data Structures	4	4
Mth 231 Discrete Math	3	3
Science/Science Sequence[1]	3	4
Distribution Requirements	3	3
Eng 202 Tech. Writing	3	3
	16	17

Fifth Semester

	B.A.	B.S.
CS 324 Systems Analysis	3	3
CS 326 Operating System Principles	3	3
Free Elective	3	–
Mth 351 Probability and Statistics	3	3
Science/Science Sequence[1]	–	4
Distribution Requirements	3	3
	15	16

Sixth Semester

	B.A.	B.S.
CS 334 Software Engineering	3	3
CS Elective[2]	3	3
CS 330 Computer Architecture	3	3
Distribution Requirement	6	6
	15	15

Seventh Semester

	B.A.	B.S.
CS 391 Senior Project I	1	1
CS Elective[2]	3	3
CS 328 Analysis of Algorithms	3	3
Free Electives	9	9
	16	16

Eighth Semester

	B.A.	B.S.
CS 392 Senior Projects II	2	2
CS Elective[2]	—	3
Free Electives	12	9
	14	14

[1] See below for the department's requirements regarding science electives.
[2] See below 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: A laboratory science sequence which must be one of the following: Bio 121-122; Chem 115-116; GES 211, 230; or Phy 201-202.

and

One additional 4-credit course in Biology, Chemistry, GeoEnvrionmental Sciences, Physics, or any Engineering course not cross-listed in Computer Science. *The course must be numbered above 200 except that Bio 121, 122, Chm 115 or 116 are also acceptable in this requirement.*

Computer Science Electives for Computer Science Majors:

B.A. candidates: CS 319 or CS 327, and one additional CS course numbered 300 or above.

B.S. candidates: CS 319 or CS 327 and two additional CS courses numbered 300 or above.

Summary of Minimum Credit Distribution for Computer Science Majors:

	B.A.	B.S.
Mth 111, 112, 202, 231 and 351	18	18
CS 125, 126, 128, 227, 230, 324, 326, 328, 330, 334, 391, 392	35	35
CS Electives	6	9
Science Electives	6	12
Eng 101, 202	7	7
Distribution Requirements	27	27
Free Electives	24	18
Minimum Total Required	123	126

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.

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. (same as EE 144)

Prerequisite: Secondary mathematics including geometry and algebra II.

Offered on demand.

CS 125. COMPUTER SCIENCE I **Four credits**

An introduction to the fundamental concepts of computer science, with emphasis on problem solving and algorithm design using a high-level programming language. Course will contain a

significant, weekly, in-class programming experience. (same as EE 145)

Prerequisite: Secondary mathematics including geometry and algebra II.
Offered every fall and spring.

CS 126. COMPUTER SCIENCE II **Four 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). Course will contain a significant, weekly, in-class programming experience. (same as EE 146).

Prerequisite: CS 125 (EE 145).
Offered every fall and spring.

CS 128. UNIX **One credit**

Basic Unix features such as the file system, the Shell, the Emacs editor, electronic mail, and other network programs. Shell and AWK programming. Course requires 1 hour lecture and 1 hour lab per week (same as EE 148).

Prerequisite: Some programming experience.
Offered every spring.

CS 215. INTRODUCTION TO COMPUTER INFORMATION SYSTEMS **Three credits**

An introduction to computers and information technology through the use of PC-based applications. The emphasis will be on surveying current technology in information systems processing and the business problems typically encountered by systems analysts.

Prerequisite: Computer experience equivalent to CS 115.
Offered every fall.

CS 224. COBOL AND FILE MANAGEMENT **Four credits**

A study of file management techniques using ANS COBOL. Intoductory and advanced programing techniques are presented using problems commonly found in a business enviorment. Topics include control break processing, tables and arrays, file processing, and interactive processing. Course requires 3 hours lecture and 2 hours lab per week.

Prerequisite: CS 125 or previous programming experience.
Offered every spring.

CS 227. COMPUTER DATA STRUCTURES **Four 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. Course will contain a significant, weekly, in-class programming experience. (same as EE 343)

Prerequisite: CS 126/EE 146 and CS 128/EE 148.
Offered every spring.

CS 230. MACHINE LANGUAGE **Four 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. Course will contain a significant, weekly, in-class programming experience. (same as EE 242)

Prerequisite: CS 126/EE 146 and CS 128/EE 148.
Offered every fall.

CS 232. DIGITAL DESIGN **Three credits**

The electronics of digital devices, including Bipolar TTL and CMOS; digital logic functions, such as AND, OR, INVERT; Boolean algebra; combinatorial logic; minimization techniques, digital storage devices; synchronous sequential design; state machines.; programmable logic. Three hours per week. (Same as EE 241) Must be taken with CS 233 Basic Digital Design Lab.

Prerequisite: Junior standing.

CS 233. DIGITAL DESIGN LABORATORY **One credit**

Diodes and bipolar transistors; switching circuits, gates, CMOS and TTL logic characteristics. Combinational design, multiplexing, sequential design (same as EE 243) Must be taken with CS 232 Digital Design

Prerequisite: Junior standing.

CS 265 MEDICAL INFORMATICS **Three credits**

This course will cover basic principles of computer use and information management in health care (including general medicine, dentistry, optometry, pharmacy). Topics will include basic computing concepts, the characteristics of medical data, and the use of computers in the administrative, diagnostic, and research-oriented medical tasks. The course is primarily directed towards students who intend to pursue careers in health-related fields. (Same as EE 265).

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/EE 343 or permission of instructor.
Offered in the spring semester of even years.

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, ARENA, GPSS, and/or SIMSCRIPT.

Prerequisites: CS 123/EE 144 or CS 125/EE 145 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 231 and CS 126/EE 146.
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 215 or CS 224 or CS 227/EE 343.
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, or CS 227 or permission of the instructor.
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 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. (same as EE 342).

Prerequisite: CS 345/EE 345.

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) **Computer Science majors may not receive credit in both CS 330 and CS 345.**

Prerequisite: CS 230/EE 242 or CS 329/EE 342.

Offered in the spring semester of odd years.

CS 334. SOFTWARE ENGINEERING **Three credits**

A course in "programming in the large." Topics include software design, implementation, validation, maintenance, and documentation. There will be one or more team projects. (same as EE 348)

Prerequisite: CS 324 and CS 128/EE 148.

Offered every spring.

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 odd 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/EE 146 and CS 128/EE 148.

Offered in the spring semester of even years.

CS 345. COMPUTER ORGANIZATION **Three credits**

Number representation, digital storage devices and computational units, bus structures; execution sequences and assembly language concepts; control units with horizontal and vertical microcoding; addressing principles and sequencing; microprocessors; basic imput and output devices; interrupts; survey of RISC principles including pipelined execution. Three hours lecture a week. (Same as EE 345) **Computer Science majors may not receive credit in both CS 330 and CS 345.**

Prerequisite: CS 232/EE 241.

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 227/EE 146, or CS 224 and CS 126/EE 146 and CS 128/EE 148.

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 227/EE 146, or CS 224 and CS 126/EE 146 and CS 128/EE 148.

Offered every spring.

CS 360. LINEAR PROGRAMMING **Three credits**

Graphical linear programming, simplex algorithm 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 even 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.

Offered spring of odd years

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 112 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 sophis-
cated problem or project under close faculty supervision. The project will be drawn from indus-
try, business, or governmental agency in the greater Wilkes-Barre area. The student will be ex-
pected 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 391. SENIOR PROJECTS I **One credit**

Design and implementation of a software project under the direction of a faculty member. Stu-
dents will normally work in teams. Detailed requirements and design documents are required
and will be presented at the end of the semester.

Prerequisite: CS 334.
Offered every fall.

CS 392. SENIOR PROJECTS II **Two credits**

Design and implementation of a software project under the direction of a faculty member. Stu-
dents will normally work in teams. Production of a finished product, including software and
documentation, is required. There will be an open-forum presentation of the project at the end of
the semester.

Prerequisite: CS 391.
Offered every spring.

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 50 in Bulletin for placement procedures.)

Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, ap-
proval 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

Adjunct Professor Harrington, Chairperson; Adjunct Faculty 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 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.

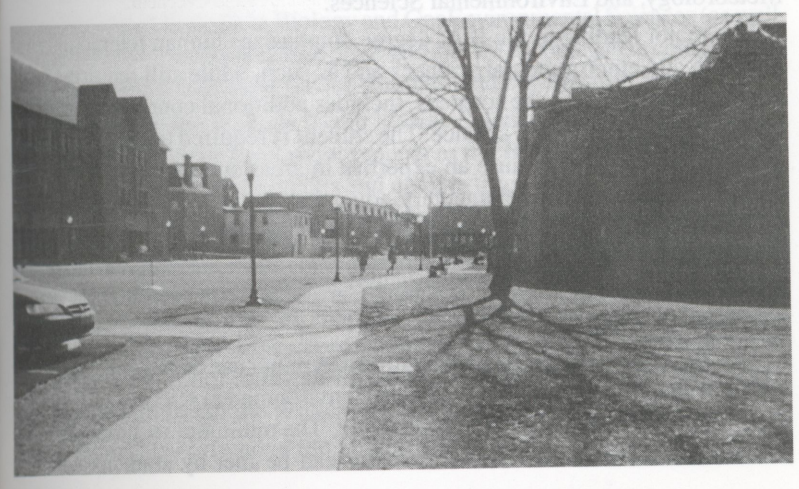
DAN 351. CLASSICAL BALLET IV **Two credits**

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 Case, Klemow, Redmond; Associate Professors Halsor, Murthy, Steele; Assistant Professors Troy, Whitman; Adjunct Faculty Hofman, McMonagle, Toothill; Lab Manager Oram; Lab Instructor McMonagle.

Total minimum number of credits required for a major in Earth and Environmental Science leading to the B.A. — 125.

Total minimum number of credits required for a major in Earth and Environmental Science leading to the B.S. — 127.

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 prequalified environmental 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 321	Hydrology	4	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.
** Required for minor in 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:

EARTH AND ENVIRONMENTAL SCIENCES

Professor Bruns, Chairperson; Professors Case, Klemow, Redmond; Associate Professors Halsor, Murthy, Steele; Assistant Professors Troy, Whitman; Adjunct Faculty Hofman, McMonagle, Toothill; Lab Manager Oram; Lab Instructor McMonagle.

Total minimum number of credits required for a major in Earth and Environmental Science leading to the B.A. — 125.

Total minimum number of credits required for a major in Earth and Environmental Science leading to the B.S. — 127.

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 prequalified environmental 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 321	Hydrology	4	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.
** Required for minor in 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 300 Behavior of Marine Organisms
MS 330 Tropical Invertebrates
MS 331 Chemical Oceanography
MS 342 Marine Botany
MS 343 Marine Ichthyology
MS 345 Ornithology
MS 362 Marine Geology
MS 394 Physiology of Marine Organisms
MS 431 Ecology of Marine Plankton
MS 432 Marine Evolutionary Ecology
MS 450 Coastal Geomorphology
MS 464 Biological Oceanography
MS 470 Research Diver Methods
MS 491 Coral Reef Ecology
MS 492 Marine Mammals
MS 493 Behavioral Ecology
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 or Dist. Req.	4-3	4-3	4-3	4-3
Mth 105 Intro. to Calculus I	4	4	4	4
PE 100 Activity	0	0	0	0
GES 240 Principles of Environmental Science	4	4	4	4
Ec 101 Economics I	—	—	3	—
PS 111 Intro. to American Politics	—	3	—	—
Psy 101 General Psychology I	—	—	—	3
Distribution Requirement	6	3	—	3
	17-18	17-18	14-15	17-18
Second Semester				
Eng 101 Composition or Dist. Req.	4-3	4-3	4-3	4-3
Bio 122 Modern Biology II	4	4	4	0
PE 100 Activity	0	0	0	0
GES 211 Physical Geology	4	4	4	4
Ec 102 Economics II	—	—	3	—
PS 141 Introduction to International Politics	—	3	—	—
Psy 221 Developmental Psychology	—	—	—	3
Distribution Requirements	3	3	3	6
	14-15	17-18	17-18	16-17
Third Semester				
BIO 225 Population and Evolutionary Biology	4	4	4	—
ME 180 CADD Lab	1	1	1	—
Phy 171 Classical and Modern	4	4	4	4
Acc 101 Introductory Financial Accounting	—	—	3	—
Eng 112 The Classical Tradition in Literature	3	—	—	—
Ed 190 Effective Teaching	—	—	—	3
PS 161 Intro. to Public Administration	—	3	—	—
Distribution Requirement	3	3	3	6
	15	15	15	13

Fourth Semester	TECHNICAL WRITING	POLITICAL SCIENCE	BUSINESS ADMIN.	EARTH & SPACE SCIENCE ED.
GES 230 Ocean Science	4	4	4	4
GES 212 Historical Geology	—	—	—	3
Phy 174 Classical and Modern	4	4	4	4
Acc 102 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	3	3	—
	17	14	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 Writing: Lit & Culture	4	—	—	—
Statistics or Computer Science Elective	—	—	—	3
PS Elective	—	3	—	—
Free Elective	3	3	3	1
GES Elective	3	3	3	3
	18	17	17	15
Sixth Semester				
GES Electives	7	7	7	—
GES 252 Climatology	—	—	—	3
GES 302 Literature Methods	1	1	1	1
GES 304 Environmental Data Analysis	2	2	2	2
GES 394 Field Study	1	1	1	1
Ed 210 Multicultural Education and Teaching Students with Special Needs	—	—	—	2
Ed 380 Content Area Reading	—	—	—	2
BA 354 Organizational Design & Behavior	—	—	3	—
Eng 202 Technical Writing	3	—	—	—
PS 261 Administrative Law & Policy	—	3	—	—
Distribution Requirements	3	3	3	3
	17	17	17	14
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	1	1	1	—
Distribution Requirements	—	3	6	—
	14	14	14	16

Eighth Semester	TECHNICAL WRITING	POLITICAL SCIENCE	BUSINESS ADMIN.	EARTH & SPACE SCIENCE ED
GES 280 Principles of Astronomy	—	—	—	4
GES 392 Senior Projects II	2	2	2	2
GES Elective	3	3	3	6
PS Elective	—	3	—	—
BA Elective	—	—	3	—
Eng 390 Projects in Writing	3	—	—	—
Free Elective	3	3	3	—
Statistics or Computer Science Elective	3	3	3	3
	14	14	14	15
Total Minimum Credits for B.A.	**127**	**126**	**126**	**125**

NOTE — Three credits of GES electives (above) **must** include either GES 271 or GES 272. 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 or	4
Distribution Requirement	3
GES 240 Environmental Science	4
Mth 111 Calculus I	4
Distribution Requirement	3
ME 180 CADD Lab	1
PE 100 Activity	0
	15-16

Second Semester	
Eng 101 Composition or	4
Distribution Requirement	3
Statistics or Computer Science Elective	3
Mth 112 Calculus II	4
Bio 122 Modern Biology II	4
Free Elective	3
PE 100 Activity	0
	17-18

Third Semester	
GES 211 Physical Geology	4
Bio 225 Population and Evolutionary Biology	4
Chm 115 Elements & Compounds	4
Distribution Requirements	3
	15

Fourth Semester	
GES 230 Ocean Science	4
Statistics or Computer Science Elective	3
Chm 116 Chemical Reaction	4
Distribution Requirement	3
	14

Fifth Semester	
Phy 171 Classical and Modern or	4
Phy 201 Introductory Physics	
GES 251 Synoptic Meteorology	4
Phy 283 Instrumentation	3
GES/ENV Elective	3
Distribution Requirement	3
	17

Sixth Semester	
Phy 174 Classical and Modern or	4
Phy 202 Introductory Physics	
GES/ENV Electives	6
GES 302 Literature Methods	1
GES 304 Environmental Data Analysis	2
GES 394 Field Study	1
Distribution Requirement	3
	17

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 Electives	4
	15

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 three hours laboratory.
Prerequisite: GES 211 or consent of instructor.

GES 218. ENVIRONMENTAL ETHICS **Three credits**
An examination of the central problems of environmental ethics as viewed from the perspectives of science and of philosophy. The value of nature and "natural objects," differing attitudes toward wildlife and the land itself, implications of anthropocentrism, individualism, ecocentrism, and ecofeminism, bases for land and water conservation, and other topics will be examined within a framework of moral and scientific argument. (same as PHL 218).
Prerequisite: PHL 101 or GES 240 or permission 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 242. ENVIRONMENTAL HEALTH **Four credits**

To provide students with an understanding of man's impact on the environment and how those impacts can be controlled or mitigated. Students completing this course should be able to recognize environmental problems and understand control and preventative measures. Three hours lecture, three hours laboratory.

Prerequisites: Introductory physics and chemistry. Students who have taken GES 240 will be admitted only with the consent of the instructor.

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.

GES 271. ENVIRONMENTAL MAPPING I: THE GLOBAL POSITIONING SYSTEM **Three credits**

An introduction to the Global Positioning System (GPS) and environmental mapping concepts and applications. Topics include coordinate systems, reference ellipsoids, geodetic datums, and map projections. Practical field use of GPS is emphasized within the context of understanding system components, satellite signal processing, selective availability, base station differential correction, and data export to a geographical information system. Two hours lecture and three hours laboratory. Fee: $45.

Prerequisite: GES 240 or GES 211 or consent of instructor.

GES 272. ENVIRONMENTAL MAPPING II: GEOGRAPHIC INFORMATION SYSTEMS **Three credits**

An introduction to Geographic Information Systems (GIS). Topics include history of GIS, relational database management, data input/output, quality control, integration with CAD and remote sensing technologies, data analysis, and GIS as a decision support tool. Laboratory component emphasizes practical skills in GIS data management and analysis. Two hours lecture and three hours laboratory. Fee: $45.

Prerequisite: GES 240 or GES 211 or consent of instructor.

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 304. ENVIRONMENTAL DATA ANALYSIS **Two credits**

To acquaint students majoring in earth and environmental sciences with the techniques and methods of data acquisition and analysis, including environmental sampling methodology and data management. Emphasis will be placed on examination of real data sets from various areas of the earth and environmental sciences with particular emphasis placed on using and applying graphical and statistical procedures used in GES 391-392 (Senior Projects).

Prerequisite: Mth 150 and junior standing.

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 three hours laboratory. Fee $45. (same as Bio 341)

Prerequisite: Bio 121-122 and consent of instructor.

Offered in alternate years.

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. (Same as BIO 343).

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.

Offered in alternate years.

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. (Same as BIO 343)

Prerequisites: Bio 121-122, 223-224, or permission of instructor.

Offered in alternate years.

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. (Same as BIO 366).

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 three 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 three 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 three 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 three 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 50 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.

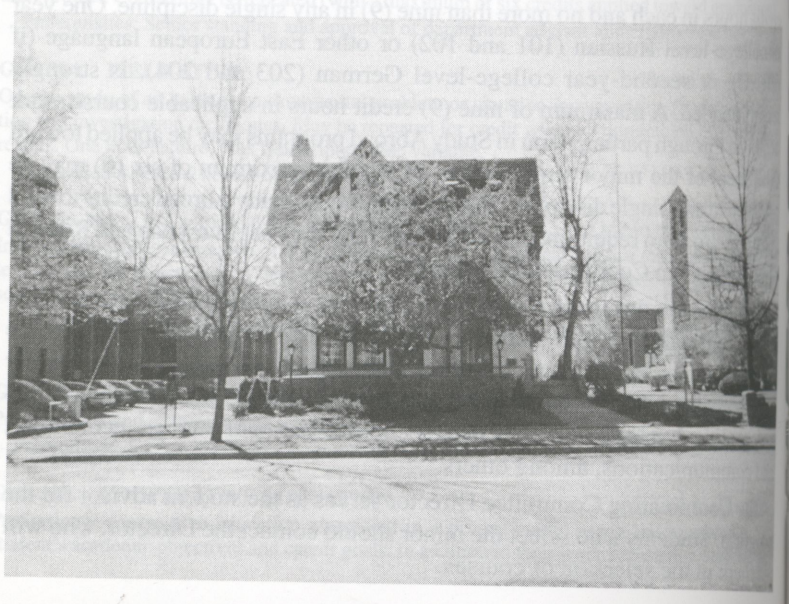
Departmental course offerings that are currently eligible for the East European and Russian Studies minor include:

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:	History of Eastern Europe
History 346:	History of the Balkans
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

Professor Baldino, Chairperson; Professor Emeritus Farrar; Associate Professor Emeritus DeYoung; Professor Taylor; Asociate Professor Seeley.

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

The Social Sciences and Communications Department offers a minor program 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 business administration, political science, sociology, 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 an academic advisor in the Department of Social Sciences and Communications.

EC 101. PRINCIPLES OF ECONOMICS **Three credits**

Presents basic economic problems and shows how these problems are solved in a free enterprise 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 and banking, fiscal policy, and monetary policy fit in with income analysis and keep the aggregate system working. The course deals mainly with macroeconomic problems.

EC 102. PRINCIPLES OF ECONOMICS II **Three credits**

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 employment of resources; economic growth and development.

EC 201. INTERMEDIATE MACROECONOMICS **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. INTERMEDIATE MICROECONOMICS **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 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; international monetary relationships.

EC 301. COMPARATIVE ECONOMIC SYSTEMS **Three credits**

The institutions of a market economy are analyzed as a foundation for purposes of comparisons. Marxist theory of prices, wages, and the demise of capitalism is studied in order to establish the

theoretical basis of Socialism and Communism. Particular stress is placed on the performance of the former Soviet economy. Attention is also given to important operational aspects 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 and how they can achieve growth and development. Topics include population, financing development, planning and programming development, as well as theories of economic development.

Prerequisites: Ec 101 and 102.

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 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 374. ECONOMICS OF HEALTH CARE **Three credits**

This course provides an economic analysis of the health care industry and the public policy issues related to it. Discussion will focus on the industry's departure from a competitive model in terms of the prevalence of asymmetric information, supplier-induced demand, widespread insurance coverage, and the growth of managed care as well as the three key public policy issues of access, cost, and quality.

Prerequisites: Ec 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 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 50 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 Polachek, Chairperson; Professors Emeriti Fahmy, Hammer, Johnson; Professor Placek; Associate Professors Lynch, Meyers; Assistant Professors B. Bellucci, Kropiewnicki.

Total minimum number of credits required for a major in Elementary Education — 125/131.

The Department of Education and Psychology 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, general science, German, mathematics, social studies, and Spanish. Copies of curricula for these programs are available in the appropriate department and in the Education and Psychology 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, English, Foreign Languages, History, Interpersonal and Organizational Communication, Journalism, Mathematics, Philosophy, Political Science, Psychology, Theatre 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, Communications or Social Studies. (Note that Wilkes certifies teachers to teach Social Studies, not the individual disciplines of History, Political Science, Psychology, and/or Sociology.)

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, ED 381, GES 261, Hst 207 and 208, PS 111, and Soc 101.

Communications certification candidates must major in communications and take the following English courses: English 201, 225, 324; any three of the survey courses in English and American literature (233, 234, 281, 282); and at least one 300-level literature course.

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

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	3
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**.

Admissions 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 a least 45 semester-hour credits;
2. A GPA of 2.5 to be admitted (and maintenance 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	
Eng 101 Composition or	4
Distribution Requirement	3
Psy 101 General Psychology	3
Mathematics Elective	3
Science Elective	3
Distribution Requirement	3
PE 100 Activity	0
	15-16

Second Semester	
Eng 101 Composition or	4
Distribution Requirement	3
Psy 221 Developmental Psychology	3
Mathematics Elective	3
Computer Science Elective	3
Major Elective	3
PE 100 Activity	0
	15-16

Third Semester	
Ed 190 Effective Teaching	3
Science Elective	3
Major Elective	3
Distribution Requirement	3
Hst 207 or 208 American History	3
	15

Fourth Semester	
Science Elective	3
Ed 200 Educational Psychology	3
Major Elective	3
Distribution Requirement	3
GES 261 Regional Geography	3
	15

Fifth Semester	
Elementary Education Requirements	9
Distribution Requirement	3
Major Electives	6
	18

Sixth Semester	
Elementary Education Requirements	6
Distribution Requirement	3
Major Electives	9
	18

Seventh Semester	
Science Elective	3
Major Electives	6
Elementary Education Requirements	6
	15

Eighth Semester	
Ed 390B Intern Teaching	15
	15

Recommended Course Sequence for Major/Certification in Secondary Education

First Semester	
Eng 101 Composition or	4
Distribution Requirement	3
Psy 101 General Psychology	3
Distribution Requirements	5-7
Major Electives	3-4
PE 100 Activity	0
	15-18

Second Semester	
Eng 101 Composition or	4
Distribution Requirement	3
Psy 221 Developmental Psychology	3
Distribution Requirements	6-8
Major Electives	3
PE 100 Activity	0
	16-18

Third Semester	
Ed 190 Effective Teaching	3
Distribution Requirements	9-10
Major Elective	3
	15-16

Fourth Semester	
Ed 200 Educational Psychology	3
Distribution Requirements	9-10
Major Elective	3
	15-16

Fifth Semester	
Distribution Requirement	3
Major Electives	6-9
Free Electives or Special Methods	3-4
Ed 210 Multicultural Ed. & Teaching Students with Speical Needs	2
	14-18

Sixth Semester	
Distribution Requirement	3
Major Electives	6-9
Free Elective	3
Ed 380 Content Area Reading	2
	14-17

Seventh Semester	
Distribution Requirement	3
Major Electives	6
Free Elective	3
Special Methods	4-5
	16-17

Eighth Semester	
Ed 390A Intern Teaching	15
	15

ED 150. PRACTICUM IN EDUCATION One credit

Provides an opportunity for students to gain experience as teachers' aides in school classroom 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 220. MULTICULTURAL EDUCATION IN A PLURALISTIC SOCIETY Two credits

This course prepares preservice teachers for the classroom environment that exists in American schools today. National ideals of achieving universal literacy, respecting individual differences and creating educational excellence for everyone are unattainable without a companion commitment to human diversity.

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. Offered fall semesters only.

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 include topics now recognized by theorists and practitioners as being most critical to developing effective school reading programs. Offered spring semesters only.

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 352. SPECIAL METHODS OF TEACHING: ART Four credits

A study of teaching strategies appropriate for the public school art program, consideration of past and present philosophies.

Prerequisites: Admission to the Teacher Education Program and ED 200.

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 **Three 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 pre-school 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 techniques 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

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 Maxwell, Chairperson; Professors Arora, Nejib; Associate Professors Gilmer, Kucirka, Srinivasan; Technical Support Staff: Lennox, Sickler, Wilk.

Total minimum number of credits required for a major in Electrical Engineering leading to the B.S. degree — 130.

Total minimum number of credits required for a minor in Computer Engineering — 20.

The Engineering and Physics 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.

Cooperative education provides applied professional training to Wilkes engineering students that is often valued by prospective employers. The electrical engineering curriculum includes an optional twelve-credit cooperative education assignment in the sixth semester. Ordinarily, the assignment will continue into the summer preceding the seventh semester. Since all students may not be willing or able to elect such a cooperative educational assignment, the following options exist: [1] The student may complete six credits of techinical electives and six credits of free electives. [2] The student may secure a six-credit co-op assignment and complete three credits of technical elective and three credits of free electives.

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.

A Computer Engineering minor is an attractive option for students majoring in Electrical or other engineering disciplines as well as for students majoring in Computer Science. This minor should be helpful in finding jobs requiring the use of computers in larger systems, especially control communications, and other application oriented systems which utilize computer control.

Minor in Computer Engineering

Required Courses:	credits
EE 144 FORTRAN or	3
EE 145 Computer Science I	4

EE 146 Computer Science II	3
EE 148 UNIX	1
EE 241 Digital Design	3
EE 243 Digital Design Lab	1
EE 345 Computer Organization	3
EE 342 Microcomputer Operation and Design	3

Plus one elective course from an Application Area:

Courses:	**credits**
EE 314 Control Systems	3
EE 350 Medical Instrumentation	3
CS 367 Computer Graphics	3
CS 355 Computer Networks	3

Total credits for Computer Engineering minor: 20

The student 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

Chm 115 Elements and Compounds	4
Mth 111 Calculus I	4
EGR 111 Introduction to Engineering	3
ME 180 CADD Lab	1
Eng 101 Composition	4
PE 100 Activity	0
	16

Second Semester

MaE 200 Materials Engineering	3
Mth 112 Calculus II	4
EE 144 FORTRAN or	3
EE 145 Computer Science I	4
Phy 201 General Physics I	4
Distribution Requirement	3
PE 100 Activity	0
	18

Third Semester

EE 211 Circuit Theory I	3
EE 283 Electrical Measurements Lab	1
Mth 211 Intro. to Differential Equations	4
Phy 202 General Physics II	4
ME 231 Statics & Dynamics	3
Distribution Requirement	3
	18

Fourth Semester

EE 148 UNIX	1
EE 212 Circuit Theory II	3
EE 251 Electronics I	3
EE 271 Semiconductor Devices	3
EE 241 Digital Design	3
EE 243 Digital Design Lab	1
MAE 284 Engineering Measurements Lab	1
	15

Fifth Semester

EE 252 Electronics II	3
EE 254 Electronics Lab	1
EE 214 Linear Systems	3
EE 336 Electromagnetics and Transmission Lines	4
EE 373 CAD for Microfab	1
EE 381 Microfabrication Lab	3
Distribution Requirements	3
	18

Sixth Semester

EE 399 Cooperative Education *or*	12
EE 399 Cooperative Education	6
Technical Elective	3
Free Elective *or*	3
Technical Elective	6
Free Elective	6
	12

Seventh Semester

EE 321 Electromechanical Energy Conversion	3
EE 337 Waveguides and Antennas	3
EE 391 Senior Projects I	1
EE Elective	3
Distribution Requirements	6
	16

Eighth Semester

EE 314 Control Systems	3
EE 361 Communications Systems	4
EE 392 Senior Projects II	2
EE Elective	3
Distribution Requirements	6
	18

EE electives may be chosen from any mathematics, science or engineering course numbered 200 or above, with at least 9 credits from EE listed courses.

Distribution requirements are selected to satisfy the General Education requirements. It is required that two courses be taken in one sub-area of the Heritage & Value Area. It is also strongly recommended that EC 101 be taken to satisfy the Society and Human Behavior area.

The required EE 336 and 337 sequence can be satisfied by the combination of Phy 331, 332, 334, and EE 335.

EE 144. 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. (same as CS 123)

Prerequisite: Secondary mathematics including geometry and algebra II.

EE 145. COMPUTER SCIENCE I **Four credits**

An introduction to the fundamental concepts of computer science, with emphasis on problem solving and algorithm design using a high-level programming language. Course will contain a significant, weekly, in-class programming experience. (same as CS 125)

Prerequisite: Secondary mathematics including geometry and algebra II.

Offered every fall and spring.

EE 146. COMPUTER SCIENCE II **Four 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). Course will contain a significant, weekly, in-class programming experience. (same as CS 126)

Prerequisite: CS 125 (EE 145). Offered every spring and fall.

EE 148. UNIX **One credit**

Basic Unix features such as the file system, the shell, the Emacs editor, electronic mail, and other network programs. Shell and AWK programming (same as CS 128).

Prerequisite: Some programming experience.

Offered every spring.

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 Fourier transforms. Computer methods in circuit analysis.

Prerequisite: EE 211.

EE 214. LINEAR SYSTEMS **Three credits**

Types of Signals and Systems: Discrete, Continuous 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 241. DIGITAL DESIGN **Three credits**

The electronics of digital devices, including Bipolar TTL and CMOS; digital logic functions, such as AND, OR, INVERT; Boolean algebra; combinational logic; minimization techniques; digital storage devices; synchronous sequential design; state machines; programmable logic. (same as CS 232) Must be taken with EE 243 Digital Design Lab.

Prerequisite: Junior standing.

EE 242. MACHINE LANGUAGE **Four 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. Course will contain a significant, weekly, in-class programming experience. Fee: $50. (same as CS 230)

Prerequisite: EE 146/CS 126.

EE 243. DIGITAL DESIGN LABORATORY **One credits**

Diodes and bipolar transistors; switching circuits, gates, CMOS and TTL logic characteristics. Combinational design, multiplexing, sequential design. (same as CS 233) Must be taken with EE 241 Digital Design. Fee: $45.

Prerequisite: Junior Standing.

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**

Circuit concepts involving nonideal dependent and constant voltage and current sources. Operational amplifiers. Development of physics, operating principles, and terminal characteristics of diodes, bipolar and field-effect transistors . Development of typical design applications and other considerations like conception, analysis, simulation, interference, small and large signal modeling, power, temperature, and frequency effects.

Prerequisite: Phy 203 and EE 212.

EE 252. ELECTRONICS II **Three credits**

Building blocks of an operational amplifier. Frequency response and bandwidth of BJT, FET, and operational amplifiers. Filters. Power amplifiers. Feedback circuits. Analog integrated circuits.

Prerequisite: EE 251.

EE 254. ELECTRONICS LABORATORY **One credit**

Design and implementation of system design principles including power supplies, BJF and FET amplifiers, power amplifiers, operational amplifiers, feedback circuits, filters, oscillators, and waveform generators. Communication skills enhancement through journal writting and formal reports. One three-hour laboratory a week. Fee: $45.

Corequisite: EE 252.

EE 265. MEDICAL INFORMATICS **Three credits**

Basic principles of computer use and information management in health care (including general medicine, dentistry, optometry, pharmacy). Basic computing concepts, characteristics of medical data, and use of computers in the administrative, diagnostic, and research-oriented medical tasks. The course is primarily directed towards students who intend to pursue careers in health-related fields.(same as CS 265)

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. One two-hour laboratory per week. Fee: $35.

Corequisite: EE 211.

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**

Laplace transforms and matrices. Mathematical modeling of physical systems. Block diagram and signal flow graph representation. Time-domain performance specifications. Stability analysis; Routh-Hurwitz criterion. Steady state error analysis. Root-locus and frequency response techniques. Design and compensation of feedback systems. Introductory state space analysis.

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; vehicle relative coordinates; 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: Senior standing.

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.

Prerequisite: Physics 332.

EE 336. ELECTROMAGNETICS AND TRANSMISSION LINES **Four credits**

Vector calculus; concepts of flux and fields; electrostatic and magnetostatic 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 hour lecture and one one-hour simulation lab a week. Fee: $15.

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. Three hours lecture and one two-hour laboratory a week. Fee: $45.

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 hour lecture and one two-hour laboratory a week. Fee: $50. (same as CS 329)

Prerequisite: EE 345.

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. Course will contain a significant, weekly, in-class programming experience. (Same as CS 227)

Prerequisite: EE 146.

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. (Same as CS 326)

Prerequisite: EE 343/CS 227.

EE 345. COMPUTER ORGANIZATION **Three credits**

Number representation, digital storage devices and computational units, bus structures; execution sequences and assembly language concepts; control units with horizontal and vertical microcoding; addressing principles and sequencing; microprocessors; basic input and output devices; interrupts; survey of RISC principles including pipelined execution. (same as CS 345)

Prerequisite: EE 241.

EE 346. COMPUTER ARCHITECTURE **Three credits**

A study of the design, organization, and architecture of computers, ranging from the microprocessors to the latest "supercomputers." (Same as 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 348. SOFTWARE ENGINEERING **Three credits**

A course in "programming in the large". Topics include software design, implementation, validation, maintenance, and documentation. There will be one or more team projects. (same as CS 334).

Prerequisite: CS 324.

Offered every spring.

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 engineering 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 PCM Sampling, channel capacity, and coding. Methods of multiplexing. Modulator and multiplexer design. Noise and its effects on communication.

Prerequisite: EE 252.

EE 371. SEMICONDUCTOR DEVICES **Three credits**

Basic properties of semiconductors and their conduction processes, with special emphasis on silicon and gallium arsenide. Physics and characterizations of p-n junctions. Homojunction and heterojunction bipolar transistors. Unipolar devices including MOS capacitor and MOSFET. Microwave and photonic devices.

Prerequisites: Physics 203.

EE 373. CAD FOR MICROFABRICATION **One credit**

Simulation tools in process design and extraction of device parameters. Process design for a bipolar junction transistor. A project on one of the following technologies: TTL, ECL, NMOS, CMOS, or BICMOS.

Prerequisite: Senior standing.

Corequisite: EE 381.

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.

Prerequisites: EE 371 and EE 336.

EE 381. MICROFABRICATION LAB **Three credits**

Physics and operational principles of bipolar junction transistors, including non-ideal effects. The theoretical and practical aspects of techniques utilized in the fabrication of bipolar junction transistors (BJT's). Crystal growth, solid solubility, alloying and diffusion, oxide masking and epitaxy. Device fabrication procedures in microelectronics, and the electrical performance of devices. Ion implantation systems as a method of fabrication. Thin and thick film techniques. Communication skills enhancement through journal writing and formal reports. One, one-and-a-half hour lecture and one, four-hour lab a week. xFee: $45.

Prerequisite: Senior standing.

EE 382. COMMUNICATION LAB **Four credits**

Characterization and measurements of communication circuits and systems. Emphasis on design and test using CAD and testing equipment. RF circuit fabrication using thick film and metal etching techniques. Frequency-domain and time-domain measurements using network analyzer and digitizing oscilloscope. Antenna design and radiation pattern measurements. Optical communication link design. Analog and digital communication system design and performance test using spectrum analyzer. Computer network simulation. Two hour lecture and one five-hour laboratory a week. Fee: $45.

Prerequisite: Senior standing.

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**

Presentation and discussion of selected topics.

Prerequisite: Senior engineering standing.

EE 398. TOPICS IN ELECTRICAL ENGINEERING **Three credits**

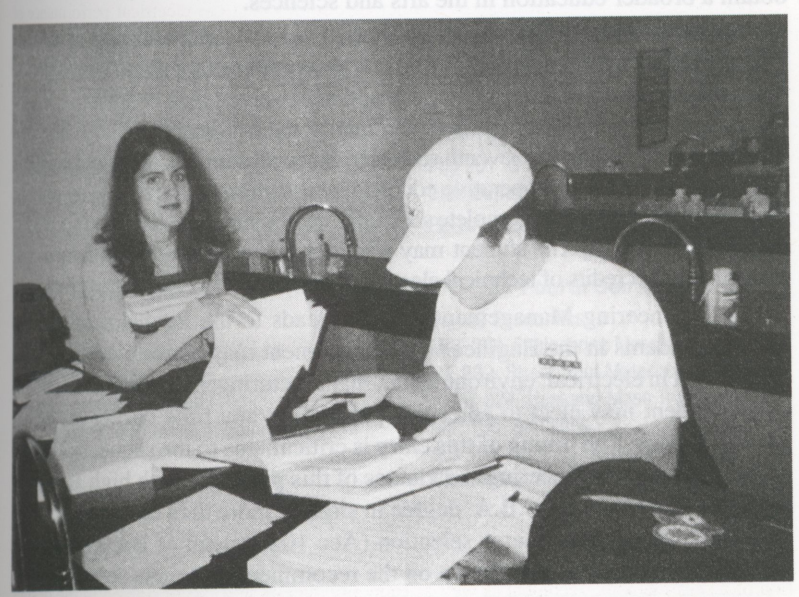
Selected topics in the field of electrical engineering. These may include one or more of the following: control systems; information theory; signals and noise measurements; communication systems; network design and synthesis; magnetic and non-linear circuits; digital and analog systems; computer systems; 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 50 in Bulletin for placement procedures.)

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



ENGINEERING

Associate Professor Maxwell, Chairperson.

EGR 111. INTRODUCTION TO ENGINEERING **Three credits**
An introduction to the methods and tools used by engineers. Included are problem solving and engineering design, scientific principles, general and technical information retrieval, proposal development, teamwork in a design project, and effective presentation methods. Students are exposed to certain ideas and methods that will recur and be further developed in both their academic and in their professional lives. Also included are assessments of engineering skills, biographies of notable scientists and engineers, and an introduction to professionalism and professional societies. Two one-hour lectures and one two-hour lab/discussion per week.

ENGINEERING MANAGEMENT

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

Total minimum number of credits required for a major in Engineering Management leading to the B.S. degree — 130.

The Department of Engineering and Physics offers 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 five-year program in Engineering Management offers the student the opportunity to obtain a broader education in the arts and sciences.

Cooperative education provides applied professional training to Wilkes engineering students that is often valued by prospective employers. The engineering management curriculum includes an optional twelve-credit cooperative education assignment in the sixth semester. Ordinarily, the assignment will continue into the summer preceding the seventh semester. Since all students may not be willing or able to elect such a cooperative educational assignment, the following options exist: [1] The student may complete six credits of techinical electives and six credits of free electives. [2] The student may secure a six-credit co-op assignment and complete three credits of technical elective and three credits of free electives.

The Engineering Management program leads to the Bachelor of Science degree. Students in the Engineering Management major must declare a preference area in electrical, environmental, manufacturing, materials, or mechanical. 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. Graduates of this program, with high academic averages, can attain an M.B.A. degree in slightly more than one calendar year at Wilkes with proper course selection (Acc 102 instead of BA 233, and Ec 101 instead of BA 321) as shown on the recommended course sequence.

The student 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 Four-Year Course Sequence for a B.S. Degree in Engineering Management

First Semester		Second Semester	
Chm 115 Elements and Compounds	4	MAE 200 Materials Engineering	3
Mth 111 Calculus I	4	Mth 112 Calculus II	4
EGR 111 Introduction to Engineering	3	EE 144 FORTRAN or	3
ME 180 CADD Lab	1	EE 145 Computer Science I	4
Eng 101 Composition	4	Phy 201 General Physics I	4
PE 100 Activity	0	Distribution Requirement	3
	16	PE 100 Activity	0
			17-18
Third Semester		**Fourth Semester**	
EE 211 Circuit Theory I	3	Ec 102 Economics II	3
EE 283 Electrical Measurements Lab	1	MAE 284 Engineering Measurements Lab	1
ME 231 Statics & Dynamics	3	ME 232 Strength of Materials or	3
Phy 202 General Physics II	4	ME 324 Heat and Mass Transfer	
Mth 211 Intro. to Differential Equations	4	Mth 150 Statistics	3
		Acc 101 Intro. to Financial Accounting	3
		Distribution Requirement	3
	15		16

Fifth Semester

EgM 321 Quant. Anal. & Prog. Methods	3
BA 321 Marketing or	3
Ec 101 Economics I	
BA 351 Management of Organizations	3
Technical Electives	3
Distribution Requirement	3
BA 233 Business Law or	
Acc 102 Managerial Accounting	3
	18

Sixth Semester

EgM 399 Cooperative Education *or*	12
EgM 399 Cooperative Education	6
Technical Elective	3
Free Elective *or*	3
Technical Elective	6
Free Elective	6
	12

Seventh Semester

EgM 391 Senior Projects I	1
BA 341 Managerial Finance	3
Technical Electives	3
Engineering Management Elective	3
Distribution Requirements	6
	16

Eighth Semester

EgM 392 Senior Projects II	2
EgM 336 Engr. & Manag. Models	3
Technical Electives	6
Engineering Management Elective	3
Distribution Requirement	3
	17

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 program preference outlines.

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 required that a two-course sequence be taken in one subarea of the Heritage and Value requirement. It is strongly recommended that Soc 391 & 392 be taken along with EgM 391 & EgM 392.

EgM 313. PRODUCTION SYSTEM ANALYSIS — **Three credits**

Manufacturing planning and control, material requirement planning, capacity planning, shop-floor control, just-in-time 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. Three hours lecture per week. (same as ME 318).

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 selection. 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 in and the art of modeling practical problems encountered by engineers and managers.

Prerequisite: EgM 321 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 50 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 Fields, Chairperson; Professors Emeriti Fiester, Gutin, Kaska, Lord, Rizzo; Professors P. Heaman, Lennon; Associate Professors Bedford, R. Heaman, Kuhar; Assistant Professor Borah; Visiting Assistant Professor Lindgren; Lecturer McKinley.

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).

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.

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, theatre, 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 or 120, 201, 233, 234, and either 281 or 282. In addition, students must complete 19 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 or 120 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.

Certification

Students seeking certification as secondary public school teachers of English must take English 112 or 120 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 or	4	Eng 120 Literature and Culture	3
Distribution Requirement	3	Distribution Requirements	12
Distribution Requirements	12	PE 100 Activity	0
PE 100 Activity	0		15
	15-16		
Third Semester		**Fourth Semester**	
Eng 201 Writing about Lit. and Culture	4	Eng Survey Electives (110, 112, 234, 281)	6
Eng Survey Electives (110, 112, 233, 282)	3	Distribution Requirement	3
Distribution Requirements	6	Free Elective	6
Free Electives	3		15
	16		

Fifth Semester

Major Electives*	6
Free Electives	9
	15

Sixth Semester

Major Electives*	9
Free Electives	6
	15

Seventh Semester

Eng 397	3
Free Electives	12
	15

Eighth Semester

Major Capstone	1
Free Electives	12
	13

*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

Eng 101 Composition or	4
Distribution Requirement	3
Distribution Requirements	12
PE 100 Activity	0
	15-16

Second Semester

Eng 120 Literature and Culture	3
Psy 101 General Psychology	3
Distribution Requirements	9
	15

Third Semester

Eng 201 Writing about Lit. and Culture	4
Eng Survey Electives (110, 112, 233, 282)	3
ED 190 Effective Teaching	3
Distribution Requirements	3
Free Elective	3
	16

Fourth Semester

Eng Survey Electives (110, 112, 234, 281)	6
Ed 200 Educational Psychology	3
Distribution Requirements	6
	15

Fifth Semester

Eng 225 Comparative Grammar	3
Eng Survey Electives (110, 112, 233, 282)	3
Major Elective*	3
Distribution Requirement	3
Free Elective	3
	15

Sixth Semester

Eng 324 History of English	3
Major Elective*	6
Free Electives	6
	15

Seventh Semester

Eng 393 The Teaching of English	4
Eng 397 Seminar	3
ED 210 Special Needs	2
Free Elective	6
	15

Eighth Semester

Major Capstone	1
Ed 390A Intern Teaching	15
	16

* Students select major electives to meet requirements in their area of concentration.

Recommended Course Sequence for a Major in English with Elementary Teacher Certification

First Semester

Eng 101 Composition or	4
Distribution Requirement	3
Mathematics Elective	3
Science Elective	3
Psy 101 General Psychology	3
Distribution Requirement	3
PE 100 Activity	0
	15-16

Second Semester

Eng 120 Literature and Culture	3
Psy 221 Developmental Psychology	3
Mathematics Elective	3
Science Elective	3
Comp. Science Elective	3
PE 100 Activity	0
	15

Third Semester

Eng 201 Writing about Lit. and Culture	4
Eng Survey Electives (110, 112, 233, 282)	3
Ed 190 Effective Teaching	3
Elementary Ed. Requirement	2
Hst 207 or 208 American History	3
	15

Fourth Semester

Eng Survey Electives (110, 112, 234, 281)	6
Ed 200 Ed. Psychology	3
Science Elective	3
Elementary Ed. Requirement	3
	15

Fifth Semester

Eng Survey Electives (110, 112, 233, 282)	3
Elementary Ed. Requirements	4
Science Elective	3
Major Electives*	6
	16

Sixth Semester

Elementary Ed. Requirements	6
Major Electives*	6
GES 261 Regional Geography	3
ED 210 Special Needs	2
	17

Seventh Semester

Distribution Requirement	3
Major Electives*	6
Eng 397 Seminar	3
Elementary Ed. Requirements	4
	16

Eighth Semester

Major Capstone	1
Ed 390B Intern Teaching	15
	16

* Students select major electives to meet requirements in their area of concentration.

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 **Four credits**

Practice in writing for specific purposes and audiences to develop a coherent voice for engaging in academic and professional discourse; practice in writing with the support of computer technology; study of primary texts, models, and principles of expository and argumentative writing to

develop critical reading, writing, and thinking skills; introductory bibliographic instruction and practice in writing that incorporates library research.

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 101.

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 101.

ENG 115. THE WESTERN TRADITION IN LITERATURE **Three credits**
Survey of western world literature from the eighteenth century to the present.
Prerequisite: Eng 101.

ENG 120. INTRODUCTION TO LITERATURE AND CULTURE **Three credits**
Exploration of fiction, poetry, drama, film and other cultural forms through critical reading, writing, and discussion.
Prerequisite: Eng 101.

ENG 201. WRITING ABOUT LITERATURE AND CULTURE **Four credits**
Introduction to conventions, theoretical approaches, research methods, and practice of literary and cultural studies. Application of contemporary critical perspectives and research methodology in reading and writing about literary and cultural texts. Designated Writing Intensive.
Prerequisite: Eng 101.

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 101.

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 101.

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 101.

ENG 225. COMPARATIVE GRAMMAR **Three credits**
A comparative and critical study of traditional, structural, and transformational-generative grammar.
Prerequisite: Eng 101.

ENG 233. SURVEY OF ENGLISH LITERATURE I **Three credits**
A study of the major works and movements in English literature from the Anglo-Saxon period through the eighteenth century.
Prerequisite: Eng 101.

ENG 234. SURVEY OF ENGLISH LITERATURE II **Three credits**
A study of the major works and movements in English literature from the Romantic movement to the present.
Prerequisite: Eng 101.

ENG 281. SURVEY OF AMERICAN LITERATURE I **Three credits**
Study of the major writers, works, and movements from the discovery of the New World to the Civil War.
Prerequisite: 101.

ENG 282. SURVEY OF AMERICAN LITERATURE II **Three credits**
Study of the major writers, works, and movements from the Civil War to the present.
Prerequisite: 101.

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 AND SCREENWRITING **Three credits**
An advanced writing workshop where students will learn how to conceive, write, and revise their own plays and screenplays. 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 101.

ENG 331. MEDIEVAL ENGLISH LITERATURE **Three credits**
A study of English literature to 1500, exclusive of Chaucer.
Prerequisite: Eng 101.

ENG 332. TUDOR PROSE AND POETRY **Three credits**
Study of English non-dramatic literature from 1485 to 1603.
Prerequisite: Eng 101.

ENG 333. SEVENTEENTH CENTURY PROSE AND POETRY **Three credits**
A study of the non-dramatic literature of the period.
Prerequisite: Eng 101.

ENG 334. THE EIGHTEENTH CENTURY — Three credits
Study of the major authors and literary traditions of the Eighteenth Century.
Prerequisite: Eng 101.

ENG 335. ROMANTIC PROSE AND POETRY — Three credits
Study of chief poets and prose writers of the Romantic Period.
Prerequisite: Eng 101.

ENG 336. VICTORIAN PROSE AND POETRY — Three credits
Study of major writers, works, and topics of the Victorian Age.

ENG 340. CHAUCER — Three credits
Study of Chaucer's major works, including *The Canterbury Tales* and *Troilus and Criseyde.*
Prerequisite: Eng 101.

ENG 342. SHAKESPEARE — Three credits
A study of selected plays; written reports on others not studied in class.
Prerequisite: Eng 101.

ENG 344. MILTON — Three credits
A study of Milton's poetry and major prose.
Prerequisite: Eng 101.

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 101.

ENG 352. AMERICAN NOVEL — Three credits
A study of the American novel from its beginning to the present.
Prerequisite: Eng 101.

ENG 355. MODERN NOVEL — Three credits
Study of the major novels of the twentieth century.
Prerequisite: Eng 101.

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 101.

ENG 361. EARLY ENGLISH DRAMA — Three credits
Study of the drama from the tenth century to 1642; reading of plays by medieval and Elizabethan dramatists exclusive of Shakespeare.
Prerequisite: Eng 101.

ENG 363. RESTORATION & EIGHTEENTH CENTURY DRAMA — Three credits
Study of the drama from 1660 to 1780.
Prerequisite: Eng 101.

ENG 365. MODERN DRAMA — Three credits
Study of important dramatists, European and American, from the time of Ibsen.
Prerequisite: Eng 101.

ENG 366. AMERICAN DRAMA — Three credits
A study of the American drama from the colonial period to the present.
Prerequisite: Eng 101.

ENG 368. CONTEMPORARY DRAMA — Three credits
A study of dramatic literature from the 1960s to the present. Works and major figures from British, American, and world drama may be included to reflect the diversity of the plays and playwrights of this period.
Prerequisite: Eng 101.

ENG 370. MODERN BRITISH POETRY — Three credits
Study of major British poetry of the twentieth century.
Prerequisite: Eng 101.

ENG 376. MODERN AMERICAN POETRY — Three credits
Study of major movements and representative figures in modern American poetry.
Prerequisite: Eng 101.

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 391-392. SENIOR PROJECTS — One credit each
An independent project in the area of the student's concentration culminating in a formal written and oral presentation. The project serves as a capstone experience demonstrating the student's learning in the major.
Prerequisite: Open only to senior English majors.

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 101.

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 50 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 101.

ENVIRONMENTAL ENGINEERING

Professor Bruns, Chairperson; Professors Case, Klemow, Redmond; Associate Professors Halsor, Murthy, Steele; Assistant Professors Troy, Whitman; Adjunct Faculty Hofman, McMonagle, Toothill; Lab Manager Oram; Lab Instructor McMonagle.

Total minimum number of credits required for a major in Environmental Engineering leading to the B.S. degree — 135.

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. (Engineers-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
Distribution Requirement	3	EE 144 FORTRAN or	3
ME 180 CADD Lab	1	EE 145 Computer Science I	4
Eng 101 Composition	4	Phy 201 General Physics I	4
PE 100 Activity	0	Distribution Requirement	3
	16	PE 100 Activity	0
			17-18

Third Semester		Fourth Semester	
Mth 211 Intro. to Differential Equations	4	GES 211 Physical Geology	4
Phy 202 General Physics II	4	GES 240 Principles of Env. Science	4
EE 211 Circuit Theory I	3	MAE 284 Engineering Measurements Lab	1
EE 283 Electrical Measurements Lab	1	ME 232 Strength of Materials	3
ME 231 Statics & Dynamics	3	Distribution Requirement	6
Distribution Requirement	3		18
	18		

Fifth Semester		Sixth Semester	
ENV 315 Soils	3	ENV 330 Water Quality	4
ENV 321 Hydrology	4	ENV 332 Air Quality	4
ME 321 Fluid Mechanics	3	EgM 320 Engineering Project Analysis	3
ME 322 Engineering Thermodynamics	3	Technical Elective	3
ME 323 Fluid Mechanics Lab	1	Distribution Requirement	3
Technical Elective	3		17
	17		

Seventh Semester

ENV 305	Solid Waste Management	3
ENV 351	Water and Wastewater Treatment	4
ENV 353	Air Pollution Control	3
ENV 391	Senior Projects I	1
Soc 391	Social Soundness Analysis I	1
Technical Elective		3
		15

Eighth Semester

ENV 322	Water Resources	3
ENV 352	Environmental Engineering Hydraulics	3
ENV 354	Hazardous Waste Management	3
ENV 392	Senior Projects II	2
Technical Elective		3
Soc 392	Social Analysis	2
		16

Senior Technical Electives may be any 200 level or higher Science or Engineering course (Bio 113, 121, 122 also will satisfy technical electives) a least one engineering course should be included in the Technical Electives. Students will be encouraged to take an Earth and Environmental Scienc course (e.g. GES 251 or GES 375), BI0 113 or 121, or CHM 231 by their advisors.

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 305. SOLID WASTE MANAGEMENT **Three credits**

Assessment of the scope of the solid waste problem and engineering and management strategies. Lecture topics include: solid waste sources, characterization and generation rates; collection and transportation technologies and management options; sanitary landfill design and operation and recycling strategies and technologies. Three hours lecture.

Prerequisites: GES 240, CH 116 or 118, Mth 112.

ENV 315. SOILS **Three credits**

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 soil genesis, classification and physical properties of soils; soil chemistry; and soil moisture relationships. Two hours lecture and three hours laboratory. Fee: $45.

Prerequisites: GES 211, Chm 116 or 118.

ENV 321. HYDROLOGY **Four credits**

A quantitative analysis of the physical elements and processes which constitute the hydrologic cycle. Topics include percipitation, infiltration, evaporation, runoff, streamflow, and ground water flow. Ground water modeling and advanced treatment of Darcy's Law is presented within the context of migration of ground water pollutants. Three hours lecture and three 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 321.

ENV 330. WATER QUALITY **Four credits**

The physical, chemical and biological processes that affect the quality of water in the natural environment. The measurement of water quality parameters in water and wastes. The behavior of contaminants in ground and surface water. Three hours lecture and three hours lab per week. Fee: $55.

Prerequisites: Chm 115 and 116 (or 118), GES 240.

ENV 332. AIR QUALITY **Four credits**

Lecture topics include study of atmospheric pollutants, their sources and effects; measurement and monitoring techniques for air pollutants; atmospheric chemistry - atmospheric chemical transformations, application of Ideal gas law, Henry's law and Fick's law; introduction to emissions of HAPs from TSDF sites; regulatory control of air pollution with emphasis on the Clean Air Act of 1990; brief study of air pollution control methods; and introduction to indoor air pollution. Lab work will include both problem-oriented and hands-on exercises. Exercises include basic gas concepts; volume measuring devices; flow, velocity and pressure measuring devices; calibration of such devices; sampling techniques using Tedlar Bags, absorbant tubes, and MIRAN (an infrared spectrophotometer). Three hours lecture and three hours lab per week. 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. Physical, chemical, biological and land-based treatment processes. Sludge handling and disposal. Three hours lecture and three hours lab. Fee: $55.

Prerequisite: ENV 330.

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**

This course provides the philosophy and procedures for design of air pollution control systems. Methods used for controlling air-borne emissions of gases, aerosols, and organic vapors are covered. Designs are carried out based on data for typical systems. Evaluations of alternatives with cost comparisons are also presented. Three hours lecture/ demonstration.

Prerequisite: ENV 332.

ENV 354. HAZARDOUS WASTE MANAGEMENT **Three credits**

An overview and application of engineering principles to management of hazardous wastes and the remediation of contaminated sites. Introduction to regulatory compliance and environmental laws. Three hours lecture.

Prerequisite: ENV 330, ENV 351.

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**

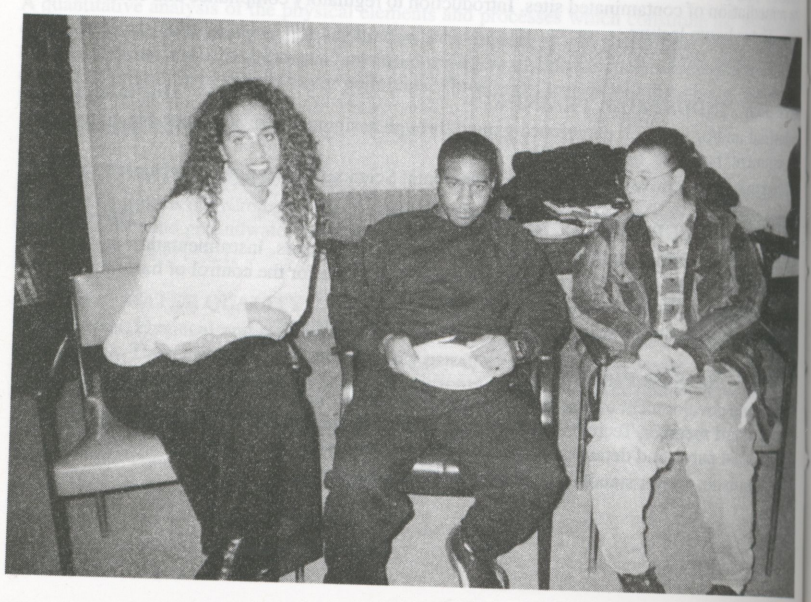
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 50 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

Assistant Professor Fields, Chairperson; Professor Karpinich; Assistant Professor Bianco.

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 below).

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 below).

Special Program

Foreign language majors may pursue a special 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 eighteen credit hours in certain specific Accounting, Business Administration and Economics courses. They devote the summer following their graduation and an additional calendar 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 Humanities.

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 or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15-16		15-16
Third Semester		**Fourth Semester**	
FL 203 Intermediate I	3	FL 204 Intermediate II	3
Distribution Requirements	6	FL 205 Conversation	3
Free electives	6	Distribution Requirements	9
	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
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	11
Free Electives	9		
	15		14

*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 or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15-16		15-16
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	2		
	14		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 or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15-16		15-16
Third Semester		**Fourth Semester**	
FL 203 Intermediate I	3	FL 204 Intermediate II	3
Ec 101 Economics I*	3	FL 205 Conversation	3
Acc 101 Accounting I*	3	Ec 102 Economics II*	3
Distribution Requirement	3	Acc 102 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 Civilization	3
FL 207 Applied Linguistics	3	FL 301 Introduction to Literature	3
BA 351 Management of Organizations*	3	BA/Ec 319 Business Statistics*	3
Distribution Requirement	3	Free Elective	6
Free Elective	3		
	15		15

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
Free Electives	9	Free Electives	9
	15		15

* Students must earn a minimum grade of 2.0 in the MBA track.

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) from the list below.

Ninth and Tenth Semesters — 24 graduate credits (8 courses) from the list below.

Summer after Tenth Semester — 6 graduate credits (2 courses) from the list below.

MBA 560 Financial and Managerial Accounting	3
MBA 512 Decision Sciences I	3
MBA 513 Decision Sciences II	3
MBA 520 Marketing Management	3
MBA 540 Financial Management	3
MBA 552 Organizational Behavior/Leadership	3
MBA 580 Business Issues in a Dynamic Environment	3
MBA 590 Strategic Management	3
MBA 532 Managerial Economics	3
MBA Electives	9
	36

Receive M.B.A. Degree at end of the summer following the tenth semester (36 graduate credits).

FRENCH

FR 101-102. ELEMENTARY FRENCH — **Three credits each**

Fundamentals of spoken and written French, and introduction to French culture. Emphasis is 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. Many 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 m.

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 50 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 is 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 50 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 is 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 a better understanding of the Russian influence upon and the relationship with its 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

Programs in other languages are offered as demand arises and as circumstances permit. Interested students should contact the department chairperson.

101-102. **Three credits each**
Designed to develop fundamental skills in the target 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 target 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 is 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 50 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

Lester J. Turoczi, Ph.D., Biology, Chemistry and Health Sciences Department Chair

Eileen M. Sharp, M.S., Coordinator for Health Sciences Professional Programs

Debra I. Chapman, M.S., Premedical and Pre-professional Programs Advisor

Adjunct Faculty: Frederick B. Rose, M.D., Director of Medical Education, Robert Packer Hospital, Sayre, PA and Richard English, M.D., Program Director, Family Practice Residency Program, Wyoming Valley Health Care System, Wilkes-Barre, PA in the premedical programs. Brian D. Spezialetti, Program Director, Medical Technology Program, Robert Packer Hospital; Mary Gene Butler, Educational Coordinator, School of Medical Technology Consortium; George A. Grinaway, M.D., Medical Director, School of Medical Technology, Wyoming Valley Health Care System; Maria Nicolette, Laboratory Education Director, School of Medical Technology, Wyoming Valley Health Care System; and Joseph King, M.D., Medical Director, Medical Technology Program, Robert Packer Hospital for the medical technology programs.

Health Sciences Committee: (reports to Dr. Bonnie Bedford, Dean of the College of Arts, Sciences and Professional Studies) Lester J. Turoczi, Ph.D., Committee Chair and Professor of Biology; Bonnie Bedford, Ph.D., Dean of the College of Arts, Sciences and Professional Studies; Debra I. Chapman, M.S., Instructor in Biology; Michael Frantz, M.A., Dean of Enrollment Services; Harvey A. Jacobs, Ph.D., Associate Professor of Pharmaceutical Sciences; Dan F. Kopen, M.D., Physician and Member of the Wilkes University Board of Trustee; Roger L. Maxwell, Ph.D., Associate Professor of Physics; Eileen M. Sharp, M.S., Coordinator for Health Sciences Professionl Programs; Michael A. Steele, Ph.D., Associate Professor of Biology; Sharon Telban, Ph.D., Associate Professor of Nursing; and Terese M. Wignot, Ph.D., Associate Professor of Chemistry.

Advisement, Guidelines and Procedures for all Health Sciences Students

Wilkes University offers programs in two areas of the health sciences: premedical and allied health. The premedical programs entail preparation for careers in allopathic and osteopathic medicine, dentistry, optometry, podiatric medicine and veterinary medicine. The allied health programs encompass physical therapy, occupational therapy, medical technology and health information management.

Students must declare a specific academic major and also complete a prerequisite core for their chosen health profession. Many premedical students major in biology, chemistry or biochemistry. However, students who have majored in the traditional liberal arts, math or engineering have also been successful in gaining admission to medical schools. 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. Many students pursuing one of the allied health areas major in biology, psychology or one of the other traditional science or social science programs.

An important component of the University's health sciences programs 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 academic major. This

academic advisor is the first point of contact regarding course planning and registration for the student. In addition, the student is counseled on the particulars of allied health, premedical and prepharmacy education by the advisors in the Health Sciences Office.

The Health Sciences Office specifically provides information about standards for admission to the various health sciences fields, time lines for individual programs, admission services for medical schools, test dates and booklets for professional school admission exams, admission deadlines, and catalogues and videotapes from the various professional schools in the health sciences.

All students planning to pursue careers in the health sciences must declare their specific interest with the Wilkes Health Sciences Office. Students must complete a **Health Sciences Declaration Form** as soon as they determine their interest and submit a schedule of their classes each semester to the office. The Declaration Form triggers the Office of Health Sciences to track the student and monitor his or her academic progress.

Premedical Programs

(Prepares students for medical programs in Allopathic Medicine, Osteopathic Medicine, Dentistry, Optometry, Podiatric Medicine and Veterinary Medicine.)

Overview

Wilkes University offers premedical 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. This perspective 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 judgement 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 are essential for the medical practitioner. As a comprehensive University, with a full range of bachelor's and master's degree programs in natural sciences, computer science, and engineering, 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. The 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. Premedical studies at Wilkes have adapted to this trend well in advance of programs at most other institutions.

Database information and scientific dynamism make it necessary to focus attention on the moral and ethical dimensions of premedical studies. Through its General Education Requirements, Wilkes provides the future physician with a highly meaningful learning experience in philosophy, ethics, and social problems. 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 nondenominational, 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 progressive program of premedical studies.

The Wilkes Premedical Core

(Required of all students aspiring to enter programs in Allopathic Medicine, Osteopathic Medicine, Dentistry, Optometry, Podiatric Medicine and Veterinary Medicine.)

A unique feature of the University's premedical education is the premed core, a sequence of courses designed to prepare students for the challenges and rigors of a medical education. The core was developed after consulting admissions personnel from medical schools regarding undergraduate courses required for admission. The premed core not only includes the traditional requirements of medical schools, but also capitalizes on the University's

strengths in science and technology.

The premedical core includes 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 Premedical Core requires the following courses as a minimum:*

2 courses in Modern Biology (BIO 121-122)

(A third course in Comparative Anatomy, BIO 314, is recommended)

4 courses in Chemistry (CHM 115-116, 231-232)

1 course in Biochemistry (CHM 361 or 362)

1 course in Medical Informatics (CS 265)

2 courses in Physics (PHY 171-174 or 201-202)

2 courses in Mathematics (MTH 105-106 or 111-112)

1 course in Psychology (PSY 101)

1-2 courses in English** (emphasizing writing skills)

Research course or a Special Project ***

*Pre-optometry students are also required to complete statistics (MTH 150), Cellular and Molecular Biology (BIO 226) and Medical Microbiology (BIO 327).

**English course requirements (as well as other prerequisite course requirements) vary from one medical school to another. It is the student's responsibility to meet the requirements of a particular medical school.

***Students enrolled in one of the accelerated seven-year programs will be waived from the senior year research course or special project.

All students intending to enter programs in medicine must complete these premed core courses. Students should work with their academic advisors to integrate this core into the recommended course sequence for their academic major as outlined in this Bulletin.

The goals of the premed core are to:

A. Help the student develop a useful scientific foundation.

B. Serve as a unique signature, which Wilkes graduates can carry forward as successful professionals.

C. Facilitate the preparation for standardized admissions tests such as the MCAT, OAT and DAT.

Letter of Evaluation

Students applying to a professional school may request a letter of evaluation from the Wilkes Health Sciences Committee. In order to receive the Letter of

Evaluation from the Committee, they must have a **Declaration Form** on file, successfully complete the premedical core, develop knowledge of and experience in the field of medicine and gain experience in the social service field by volunteering their time with community agencies. These types of experiences are required by most medical schools. The application for the committee letter must be received by May 14th of the student's junior year.

Placement of Premedical Students

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 George Washington, Georgetown, Harvard, Johns Hopkins, MCP-Hahnemann University, Pennsylvania State University-Hershey, Stanford, Temple Universtiy, Thomas Jefferson University, Tulane, the University of Pennsylvania, the University of Pittsburgh and Yale. A number of Wilkes students also enter Osteopathic Medical Schools such as Lake Erie College of Osteopathic Medicine, the Philadelphia College of Osteopathic Medicine, Ohio University College of Osteopathic Medicine, and University of Health Sciences College of Osteopathic Medicine in Kansas City.

Wilkes students have attended dental school at the University of Connecticut, Tufts University, the University of Pittsburgh, the University of Buffalo School of Dental Medicine, and Temple University. Preoptometry students have gained admission to institutions such as Illinois College of Optometry, New England College of Optometry, Ohio State University College of Optometry, and Pennsylvania College of Optometry. Podiatric medical schools accepting Wilkes students include California College of Podiatric Medicine, New York College of Podiatric Medicine, Ohio College of Podiatric Medicine, and Temple University School of Podiatric Medicine. Wilkes students have also gained admission to veterinary schools such as the Oklahoma State Unviersity School of Veterinary Medicine, the University of Illinois School of Veterinary Medicine, University of Pennsylvania School of Veterinary Medicine, the University of Wisconsin-Madison Veterinary School and the Virginia-Maryland Regional College of Veterinary Medicine.

Affiliated Degree Programs in Medicine

Wilkes has developed special programs and established agreements with major medical schools which lead to a baccalaureate degree from Wilkes and the professional degree in medicine. Students selected to participate in such a program must satisfy all requirements as articulated in each specific affiliation agreement.

I. Early Admission Programs in Allopathic Medicine

A. Premedical Scholars Programs with MCP-Hahnemann University Schoool of Medicine (MCPHU)

MCP-Hahnemann University School of Medicine (MCPHU) in Philadelphia, Wilkes University and the Guthrie Health Care System, which includes Robert Packer Medical Center in Sayre, Pennsylvania, offer a special Premedical Scholars Program for outstanding high school seniors from northeatersn Pennsylvania and the southern tier of New York State.

MCPHU and Wilkes University also offer a Premedical Scholars Program in conjunction with the Wyoming Valley Health Care System (WVHCS) for outstanding high school seniors from northeastern Pennsylvania.

These two programs allow high school seniors to be assured admission to MCP-Hahnemann Universtiy School of Medicine as they enter Wilkes Universtiy to do their undergraduate work. The programs are as follows:

1. Program Format

A. Four (4) years of successful undergraduate premedical study at Wilkes University, which includes completion of an academic major and the premedical core.

B. Four (4) years of medical school study at MCP-Hahnemann University.

C. Students in the Guthrie Program will spend the 7th or 8th semester of undergraduate study at the Robert Packer Medical Center at Sayre, Pennsylvania, doing clinical and basic science research and studying the rural and semi-rural Health Care Delivery System of northeastern Pennsylvania and the lower tier of New York.

Students in the WVHCS Program will spend the 7th or 8th semester of undergraduate premedical study at the Wyoming Valley Health Care System, Wilkes-Barre, Pennsylvania studying the semi-rural Health Care Delivery System of northeastern Pennsylvania.

The off-campus semester requires a total of 15 credits of course work, including Cooperative Education in Clinical Observation, Senior and/or Independent Research, Lectures in Biomedicine and Discussions on Medical Ethics and Alternative Therapies. Faculty advisors can elaborate on how this impacts on course requirements in each department.

D. Students in the Guthrie Program will spend parts of the 3rd and 4th years in medical school doing required and elective clinical rotations at Robert Packer. Students in the WVHCS Program will spend parts of the 3rd and 4th years in medical school doing research and elective clinical rotations at the Wyoming Valley Health Care System.

2. Program Admission

A. High school applicants must have a minimum combined SAT score of 1270 and high GPA &/or high class ranking to be considered for admission to the Premedical Scholars Program.

B. Approximately 12 premedical scholars will be admitted to the Guthrie Program and four (4) to the Wyoming Valley Health Care Program each year.

C. Students admitted to the Guthrie Program, after successful interviews at Wilkes, Robert Packer Medical Center, and MCP-Hahnemann, will be simultaneously assured admission to medical school at MCPHU and to Wilkes University. Students admitted to the WVHCS Program, after interviews at Wilkes, WVHCS and MCPHU, will be simultaneously assured admission to the medical school at MCPHU and to Wilkes University.

D. Students must maintain a GPA of 3.3 during their first three (3) years at Wilkes without repeating a course. Students who receive a grade below a 2.0 in any course will be automatically disqualified from the program. Students must score at least 24 [with no score less than an eight (8)] on the MCAT by the end of their junior year at Wilkes to complete the medical school admission requirements. Additional requirements will be specified in the acceptance letter from the medical school.

E. Emphasis in recruiting will be placed on students from Pennsylvania and the lower tier of New York for the Guthrie Program and northeastern Pennsylvania for the WVHCS Program.

F. The deadline for application for these programs is December 1, 1999.

G. Successful applicants should expect to be interviewed at Wilkes prior to December 20, 1999. Finalists from this interview will be called to subsequent interviews in early January of 2000.

B. The Premedical Scholars Program with the State University of New York Health Science Center at Syracuse, New York (SUNY-Syracuse)

The State University of New York Health Science Center at Syracuse, New York (SUNY-Syracuse), Wilkes University and the Guthrie Health Care System, which includes Robert Packer Medical Center in Sayre, Pennsylvania, offer a special Premedical Scholars Program for outstanding high school seniors from the southern tier of New York State.

This program allows high school seniors to be assured admission to SUNY-Syracuse School of Medicine as they enter Wilkes University to do their undergraduate work. The program is as follows:

1. Program Format

A. Four (4) years of successful undergraduate study at Wilkes University, which includes completion of an academic major and the premedical core.

B. Four (4) years of medical school study at the State University of New York Health Science Center at Syracuse (SUNY Syracuse).

C. Students in the program will spend the 7th or 8th semester of undergraduate study at the Guthrie Health Care System Robert Packer Hospital at Sayre, Pennsylvania, doing clinical and basic science research, and studying the rural and semi-rural Health Care Delivery system of New York. The off-campus semester requires a toal of 15 credits of course work, including Cooperative Education in Clinical Observation, Senior and/or Independent Research, Lectures in Biomedicine and on Medical Ethics and Alternative Therapies. Faculty advisors can elaborate on how this impacts on course requirements in each department.

D. Students in the SUNY-Syracuse program will spend part of the 3rd and 4th year in medical school doing required and elective clinical rotations at Robert Packer Medical Center.

2. Program Admission

A. High school applicants must have a minimum combined SAT score of 1200 to be considered for admission to the SUNY-Syracuse Premedical Scholars Program.

B. Students admitted to the program, after successful interviews at Wilkes, Robert Packer Medical Center, and SUNY-Syracuse, will be simultaneously assured admission to medical school at SUNY-Syracuse School of Medicine and to Wilkes University.

C. Students must maintain a minimum GPA of 3.5 in biology, chemistry, mathematics and physics (BCMP) during their first three (3) years at Wilkes to complete the medical school admission requriements. [No Medical College Admission Test (MCAT) is required] Additional requirements will be specified in the acceptance letter from the medical school.

D. Emphasis in recruiting for this program will be placed on students from the southern tier of New York State.

E. The deadline for application is December 1, 1999.

F. Successful applicants should expect to be interviewed at Wilkes prior to December 20, 1999. Finalists from this interview will be called to subsequent interviews in early January 2000.

II. Seven-Year Affiliated Medical Programs

In addition to the traditional four-year premedical undergraduate programs, Wilkes University has developed affiliations with medical schools in osteopathic medicine, dentistry, optometry, and podiatric medicine that permit students to spend three years at Wilkes in the basic sciences and liberal arts and four years at the affiliated medical school. The University has developed these seven-year medical programs with the following institutions:

Philadelphia College of Osteopathic Medicine (PCOM)
Temple University School of Dentistry (TUSD)
Pennsylvania College of Optometry (PCO)
Pennsylvania College of Podiatric Medicine (PCPM)
State University of New York College of Optometry (SUNY-Optometry)

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 student the baccalaureate degree.

Wilkes University students must be endorsed after their sophomore year by the Health Sciences Committee to apply to any of the affiliated institutions. Only students who have earned a high grade point average by the end of their sophomore year and who have fulfilled appropriate requirements of the Premed Core and the General Education Requirements will be endorsed for the seven-year programs. Students whose academic credentials fall beneath the standards set by the Committee will be advised to complete a third year of study at Wilkes before making reapplication. Decisions for admission to these medical schools are made by a Joint Admissions Committee from Wilkes University and the affiliated institution. Students must meet all admission requirements as outlined by the medical schools with the final admission decision determined by the medical institution.

- **Philadelphia College of Osteopathic Medicine (PCOM)**

PCOM holds up to fifteen (15) seats each year for Wilkes University students who are recommended by the Health Sciences Committee for admission and who meet all of PCOM's admission requirements. Students should consult the Wilkes Health Sciences Office for information regarding PCOM's requirements for a minimum grade point average and MCAT score.

- **Temple Unviersity School of Dentistry (TUSD)**

TUSD reserves a minimum of four (4) seats each year for Wilkes students who meet all of Temple University's admission requirements. Wilkes students will be granted an automatic invitation for an interview if they meet the following minimum requirements as specified by Temple Dentistry:

A. Track as a science major in theWilkes predental program.

B. Submit application letter to TUSD prior to January 1 of the junior year at Wilkes.

C. Receive a Letter of Evaluation from the Wilkes University Health Sciences Committee.

D. Earn a minimum grade point average by the end of the 5th semester of 3.5 in the Basic Sciences, 3.4 in the Sciences and 3.3 overall.

E. Earn a minimum of 18 in the Science section and 17 as the academic average on the Dental Admission Test (DAT).

Students who are interviewed will then be evaluated for admission by the Temple University Admission Committee.

- **Philadelphia College of Optometry (PCO)**
- **State University of New York College of Optometry (SUNY-Optometry)**
- **Temple University School of Podiatric Medicine (TUSPM)**

PCO holds up to four (4) seats, SUNY-Optometry holds up to six (6) seats, and TUSPM holds up to six (6) seats each year for Wilkes University students who are recommended by the Wilkes Health Sciences Committee for admission and who meet all of the appropriate institution's admission requirements. Students should consult the Wilkes Health Sciences Office for information regarding requirements for a minimum grade point average (GPA) and a minimum score on the appropriate medical school admission test.

Wilkes Unversity takes pride in having developed these affiliated seven-year medical programs, which have been ongoing since the late nineteen seventies. Currently large numbers of alumni who graduated from these programs are in successful professional practice. We encourage especially highly motivated and academically gifted students to take advantage of these abbreviated specialized programs and join those already enrolled in this pursuit.

III. State University of New York, State College of Optometry Scholars Program.

A. Wilkes University and the State University of New York, State College of Optometry offer a special academic affiliation in optometric education in which up to six (6) students per year may be admitted into a seven-year Bachelor of Arts or Science (B.A. or B.S.) and Doctor of Optometry (O.D.) program. Students accepted to this joint degree program are admitted to a designated, prescribed major at Wilkes University and simultaneously admitted to candidacy to the SUNY College of Optometry's professional program of study.

1. Program format

A. Three (3) years of successful undergraduate study at Wilkes University, which includes course work in an academic major and in the premedical core.

B. Four (4) years of Optometry School study at SUNY College of Optometry.

C. Students in this program must also visit and shadow three different professional optometric offices in order to become more fully acquainted with the profession of optometry during their undergraduate study at Wilkes University.

2. Program Admission

A. High school applicants must have a minimum combined SAT of 1200 (at least 600 math and 550 verbal), a minimum of 92 for their high school grade point average, and to place in the top 10% of their graduating class.

B. Students admitted to the SUNY Optometry Scholars Program, after successful interviews at Wilkes and SUNY College of Optometry, will be simultaneously admitted to candidacy at the Optometry School at State University of New York, College of Optometry and to Wilkes Universtiy.

C. Students in this program must maintain a GPA of 3.3 overall and a 3.3 in the requried science and math portion of the joint degree track curriculum, with no grade lower than 2.0 in the science and math prerequisite courses. Students must also attain a total science score above 330 on the Optometry Admissions Test (OAT) with no score in any one area below 310.

D. Students must receive a positive Letter of Evaluation from the Wilkes Health Sciences Committee, pass reasonable personal interview standards and submit all requried application material.

B. SUNY Optometry also offers an Early Assurance program to which Wilkes sophomores interested in a career in optometry may apply. To be considered, each applicant must:

1. Have completed two (2) years of undergraduate study (approximately 60 hours).
2. Have a total GPA of 3.3 and a 3.3 GPA in the SUNY prerequisite science and math courses, with no lower than a C in any of the SUNY prerequisite courses.
3. Demonstrate a basic knowledge of and a motivation for a career in optometry.
4. Supply high school and college transripts and SAT scores to SUNY Optometry.
5. Receive a Letter of Evaluation from the Wilkes University Health Sciences Committee

IV. Transfer Medical Degree Program

Typically, four (4) years of undergraduate study are required to qualify for the bachelor's degree. Wilkes University makes an exception to this requirement in special circumstances for doctoral students in allopathic and osteopathic medicine, dentistry, optometry, podiatric medicine and veterinary medicine.

These students may, with the approval of the Wilkes 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 baccalaureate degree rests with the Academic Standards Committee of Wilkes University.

Allied Health Programs

(Prepares students for admission to Physical Therapy and Occupational Therapy schools, as well as programs in Medical Technology and Health Information Management.)

Overview

With career opportunities expanding in the allied health fields known as physical therapy, occupational therapy, medical technology and health information management, admission to programs in these areas has become increasingly competitive. Wilkes University has defined an approach to preallied health education to produce competitive, noteworthy candidates for admission.

The University has structured a program of study emphasizing the basic sciences and social sciences to provide students with the appropriate background knowledge to enter occupational and physical therapy programs. The curriculum is complemented by an advisement system that closely monitors the student's academic progress and their application process to the professional program.

Students interested in allied health fields must meet with their academic advisors and advisors from the Health Sciences Office early in their freshman year to work out an individualized course of study. Students may plan to apply to an undergraduate program in physical therapy, occupational therapy, medical technology, or health information management after two or three years of course-work at Wilkes, or they may plan to complete an undergraduate degree at Wilkes and apply to an entry-level allied health master's degree program. Both career plans affect course selection and must be reviewed with the academic and health sciences advisors.

I. 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 parts. 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.

Physical therapists are qualified to utilize such physical agents as therapeutic heat, light, electricity, water, exercise, or massage in treating patients. Treatment may consist of teaching the patient an exercise regimen 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 or 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.

The Wilkes Pre-Physical Therapy Core

In addition to completing an academic major, each student must also complete the Wilkes University Pre-Physical Therapy Core, which provides a base from which students can structure their classes. The pre-physical therapy core includes a sequence of courses that are common prerequisites at most physical therapy schools. It must be emphasized that there are no universal prerequisite courses for all physical therapy programs.

The Wilkes Pre-Physical Therapy Core requires as a minimum:

Two Courses in Modern Biology (BIO 121-122)
Two Courses in Anatomy and Physiology (BIO 331-332)
One of the following Biology courses: BIO 323, 324, 326, 327, 345 or research
Two Courses in General Chemistry (CHM 115-116)
Two Courses in Physics (PHY 171-174)
Two Courses in Mathematics (MTH 100-105/111 or MTH 101-102)
Three Courses in Psychology (PSY 101, 221, and 222)
One Course in Sociology (SOC 101)
(An additional course, SOC 251, is also recommended)
One Course in Statistics (PSY 200 or MTH 150)
Cooperative Education or Internship

In addition to completing the core, students must consult prerequisite guidelines published by the particular institutions from which they wish to gain admission.

Institutions have varied prerequisites and generally require a certain number of volunteer hours in physical therapy. Some or all of those hours may be fulfilled by the Wilkes Cooperative Education Office.

Affiliated Programs in Physical Therapy

A. Affiliated Program with MCP-Hahnemann University School of Health Professions

The affiliated physical therapy program requires four (4) years of study at Wilkes University leading to the Bachelor's Degree and two (2) years of study at MCP-Hahnemann University leading to the Master's Degree in Physical Therapy. Early admission to the MCP-Hahnemann University graduate program is granted to up to five (5) Wilkes students, who have satisfied all requirements for admission, per year.

Students should consult the Office of Health Sciences for the prerequisite courses required for admission to MCP-Hahnemann University School of Health Professions.

Wilkes students applying to MCP-Hahnemann University 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 outline, with a cumulative grade point average of 3.25 or above.
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.
5. Petition to the Wilkes University Health Sciences Committee for a Letter of Evaluation to accompany their application. This request must be made in writing to the Committee by May 14th of the student's junior year.
6. Obtain a Letter of Evaluation/Recommendation from a licensed physical therapist.

Students who meet the guidelines of this program will be automatically granted an interview with the MCP-Hahnemann Physical Therapy Committee on Admissions. The decision to offer acceptance to students into this program shall be made by the Program in Physical Therapy Committee on Admissions of MCP-Hahnemann University. In addition, students must also complete all requirements for a bachelor's degree from Wilkes University prior to matriculation at MCP-Hahnemann University.

B. Affiliated Program with Temple University

This affiliated physical therapy program requires three (3) years of study at Wilkes University and three (3) years of study at Temple University. Students in this program will be granted the bachelor of science degree from Wilkes University following successful completion of their first year at Temple providing that they have met the Wilkes General Education requirements. They will be awarded the Master of Physical Therapy degree following successful completion of three years at Temple.

The affiliated physical therapy program with Temple University requires students to complete a series of prerequisite courses as part of their three years of study at Wilkes. A listing of these courses is available in the Wilkes Health Sciences Office.

Candidates also need to complete the Graduate Record Exam (GRE) in the fall semester of their third year of study at Wilkes. 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 the standards of this affiliated program will be given special consideration for admission by Temple.

II. Occupational Therapy

Occupational therapists work with members of the community who encoutner difficulties with tasks of living. These 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, and schools to reach a wide population of all ages.

The Wilkes Preoccupational Therapy Core

In addition to completing an academic major, each student must also complete the Wilkes University Preoccupational Therapy Core. The Preoccupational Therapy Core provides a base from which students can structure their classes. The preoccupational therapy core includes a sequence of courses identified by the American Association of Occupational Therapy Schools as common prerequisites at most occupational therapy schools. It must be emphasized that here are no universal prerequisite courses for all existing occupational therapy programs.

The Wilkes Pre-Occupational Therapy Core requires as a minimum:

Two Courses in Modern Biology (BIO 121-122)
Two Courses in Anatomy and Physiology (BIO 115-116 or BIO 331-332)
One Course in Chemistry (CHM 115)
One Course in Mathematics (MTH 100, 101 or 105)
Four Courses in Psychology (PSY 101, 200, 221 and 222)
One Course in Sociology (SOC 101)
(An additional course, SOC 251, is also recommended)
Cooperative Education or Internship

In addition to completing the core, students must consult prerequisite guidelines published by the particular institutions from which they wish to gain admission. Institutions have varied prerequisites and generally require a certain number of volunteer hours in occupational therapy. Some or all of those hours may be fulfilled by the cooperative education or internship experience available through the Wilkes Cooperative Education Office.

Affiliated Program in Occupational Therapy at Temple University

The program requires the completion of two (2) years at Wilkes and three (3) years at Temple University. Students should consult Temple University for information about admission procedures and requirements, since they must meet Temple's requirements for admission to be accepted as a transfer student.

Students must complete Temple University's departmental and core curriculum requirements while at Wilkes before applying to Temple for admission. Students should consult the Office of Health Sciences for a list of Wilkes equivalents to Temple's core requirements.

Placement of Pre-Physical Therapy and Pre-Occupational Therapy Students

Wilkes University graduates have been accepted to a number of physical therapy and occupational therapy schools including: Columbia University College of Physicians and Surgeons, MCP-Hahnemann University School of the Health Sciences, Tufts Graduate School of Arts and Sciences, Thomas Jefferson University Program in Occupational Therapy, Temple University Health Sciences Center, Allegheny University, and Universtiy of Pittsburgh School of Health and Rehabilitation Sciences.

III. Medical Technology

Professor Turoczi; Associate Professor Pidcock; Adjunct Faculty Brian D. Spezialetti (Program Director, Medical Technology Program, Robert Packer Hospital), Mary Gene Butler (Educational Coordinator, School of Medical Technology Consortium), Dr. George A. Grinaway (Medical Director, School of Medical Technology, Wyoming Valley Health Care System), Maria Nicoletti (Laboratory Education Director, School of Medical Technology, Wyoming Valley Health Care System), Dr. Joseph King (Medical Director, Medical Technology Program, Robert Packer Hospital).

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 of clinical training. Folowing graduation from the programs, the student will receive the B.S. degree in medical technology from Wilkes 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 Robert Packer Hospital in Sayre, PA, the Scranton Medical Technology Consortium in Scranton, PA, and the Wyoming Valley Health Care System in Wilkes-Barre, PA. Fulfillment of the fourth year requirement at non-affiliated hospitals requires special permission of the department chairperson and the Wilkes Academic Standards Committee.

RECOMMENDED COURSE SEQUENCE FOR A MAJOR IN MEDICAL TECHNOLOGY

FIRST SEMESTER		SECOND SEMESTER	
Bio 121 Principles of Modern Biology I	4	Bio 122 Principles of Modern Bio II	4
Chm 115 Elements and Compounds	4	Chm 116 The Chemical Reaction	4
Eng 101 Composition or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
Mth 105 or 111 Calculus I	4	Mth 106 or 112 Calculus II	4
PE 100 Activity	0	PE 100 Activity	0
	15-16		15-16
THIRD SEMESTER		**FOURTH SEMESTER**	
Bio 225 Population and Evolutionary Biology I	4	Bio 226 Cellular and Molecular Biology	4
Chm 231 Organic Chemistry I	4	Chm 232 Organic Chemistry II	4
Distribution Requirements	9	Distribution Requirements	9
	17		17
FIFTH SEMESTER		**SIXTH SEMESTER**	
Bio 327 Medical Microbiology	4	Bio 326 Immunology and immunochemistry	4
Computer Science Elective	3	Bio 397 Professional Prep. Techniques	2
Phy 171 Classical and Modern Physics	4	Chm 242 Applications of Instrumental Analysis	2
Distribution Requirement	3	Mth 150 Elementary Statistics	3
	14	Distribution Requirements	6
			17

SEVENTH AND EIGHTH SEMESTERS

MEDICAL TECHNOLOGY PROFESSIONAL STUDY YEAR

The 30 credits supplied by the twelve months of 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

The toal minimum number of credits required for a major in Medical Technology leading to the B.S. degree is 122.

IV. Health Information Management

In addition to completing an academic major, students may also take courses which will qualify them for admission into a program in 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 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 in Health Information Management

Wilkes University offers an affiliated program in Health Information Management with Temple University. This program requires the completion of two (2) years of study at Wilkes and two (2) years of study at Temple. Students must meet Temple's admission and prerequisite core requirements, with the final decision for admission to the program determined by Temple. Students should consult the Wilkes Health Sciences Office for a list of Wilkes University equivalents to Temple's prerequisite core requirements.

Other Professions

Information on academic programs in related health fields, such as Nursing, Prepharmacy and Pharmacy (Pharm. D. Degree), may be found in the appropriately labeled sections of this Bulletin.

HISTORY

Associate Professor Fields, Chairperson; Professor Emeritus Shao; Assistant Professor Emeritus Berg; Professors Berlatsky, Breiseth, Cox, Rodechko; Associate Professor Hupchick; Assistant Professors Hepp, Meyers.

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 43 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, which allows a student to complete the MBA in one calendar year plus two summers following graduation with a B.A. degree in history.

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 or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15-16		15-16

Third Semester	
Hst 207 American History I	3
Distribution Requirements	6
Free Electives	6
	15

Fourth Semester	
Hst 208 American History II	3
Distribution Requirements	9
Free Elective*	3
	15

Fifth Semester	
Major Electives	6
Free Electives*	9
	15

Sixth Semester	
Major Electives**	6
Free Electives*	9
	15

Seventh Semester	
Major Elective	3
Free Electives*	12
	15

Eighth Semester	
Hst 391 Historiography & Research**	3
Major Elective	3
Free Electives*	8
	14

*Sufficient elective credits are available to allow students to complete a minor in most fields. See Wilkes **Bulletin** for minor requirements.
**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	
Eng 101 Composition or	4
Distribution Requirement	3
Hst 101 World Civilization I	3
Distribution Requirements	9
PE 100 Activity	0
	15-16

Second Semester	
Eng 101 Composition or	4
Distribution Requirement	3
Hst 102 World Civilization II	3
Distribution Requirements	9
PE 100 Activity	0
	15-16

Third Semester	
Hst 207 American History I	3
Acc 101 Financial Accounting**	3
Ec 101 Economics I**	3
Distribution Requirement	3
Free Elective*	3
	15

Fourth Semester	
Hst 208 American History II	3
Acc 102 Managerial Accounting**	3
Ec 102 Economics II**	3
Distribution Requirement	3
Free Elective*	3
	15

Fifth Semester	
Major Electives	6
Distribution Requirement	3
Free Electives*	6
	15

Sixth Semester	
Major Electives	6
BA/Ec 319 Business Statistics**	3
Free Electives*	6
	15

Seventh Semester	
Major Electives	6
BA 351 Management of Organizations**	3
Free Electives*	6
	15

Eighth Semester	
Hst 391 Historiography and Research	3
Free Electives*	11
	14

*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.

**Students must earn a minimum grade of 2.0 in the MBA track .

Receive B.A. Degree with a Major in History at end of eighth semester (120 undergraduate credits).

Summer after Eighth Semester — 6 credits (2 courses) from the list below.

Ninth and Tenth Semesters — 24 credits (8 courses) from the list below.

Summer after Tenth Semester — 6 credits (2 courses) from the list below.

MBA 560 Financial and Managerial Accounting	3
MBA 512 Decision Sciences I	3
MBA 513 Decision Sciences II	3
MBA 520 Marketing Management	3
MBA 540 Financial Management	3
MBA 552 Organizational Behavior/Leadership	3
MBA 580 Business Issues in a Dynamic Environment	3
MBA 590 Strategic Management	3
MBA 532 Managerial Economics	3
MBA Electives	9
	36

Receive M.B.A. Degree at the end of the summer following tenth semester (36 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, envrionment, 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. HISTORY OF EASTERN EUROPE **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. HISTORY OF THE BALKANS **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 trnasformation 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 50 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

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

The two-year program in Industrial Engineering is offered by the Department of Engineering and Physics. 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
Egr 111 Introduction to Engineering	3	EE 144 FORTRAN or	3
ME 180 CADD Lab	1	EE 145 Computer Science I	4
Eng 101 Composition or	4	Phy 201 General Physics I	4
Distribution Requirement	3	Eng 101 Composition or	4
PE 100 Activity	0	Distribution Requirement	3
	15-16	PE 100 Activity	0
			17-18

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. or Distribution Requirement	3
Phy 202 General Physics II	4	ME 232 Strength of Materials or ME 324 Heat and Mass Transfer	3
Distribution Requirement	3	Distribution Requirement	3
	18		17

INTERNATIONAL STUDIES

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 43 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

Third World
- Anthropology 102, 213, 214, 321, 352, 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 37-41 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

Eng 101 Composition or	4
Distribution Requirement	3
Ec 101 Principles of Economics I	3
Ant 101 Intro. to Anthropology	3
Foreign Language*	3
Free Elective	3
PE 100 Activity	0
	15-16

Second Semester

Eng 101 Composition or	4
Distribution Requirement	3
Hst 102 World Civilization II	3
Ec 102 Principles of Economics II	3
PS 141 Introduction to International Politics	3
Foreign Language*	3
PE 100 Activity	0
	15-16

Third Semester

Hst 101 World Civilization I	3
Ant 102 Cultural Anthropology and/or	
Ec 301 Comparative Economic Systems*	3-6
Foreign Language*	3
Distribution Requirement	3
	12-15

Fourth Semester

Ec 310 Economic Development and/or	
Ec 340 International Trade	3
Foreign Language*	3
Distribution Requirements	6
Major Elective	3
	15

Fifth Semester

Study Abroad**

	15

Sixth Semester

	15

Seventh Semester

Foreign Language	3
Major Electives	6
Distribution Requirements	6
	15

Eighth Semester

Foreign Language	3
Major Elective	3
Distribution Requirement	3
Senior Seminar*	3
	12

*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

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

Introductory Materials Engineering courses are provided in support of majors in various science and engineering programs. Select upper-division Materials Engineering courses are offered from time to time as interest and need dictate. Students may find these courses helpful as electives in any of the programs offered by the University. Students who are planning to transfer to institutions which offer a major in Materials Engineering or any number of closely related disciplines will find these upper-division course offerings to be especially helpful. For information on courses, course availability, or using Materials Engineering course work to strengthen your major or to enhance your transfer prospects, contact the Department of Engineering and Physics.

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 260)

Prerequisites: Phy 201, 202.

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 machanics.

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 a 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-based and ceramic-based products. Three hours lecture a week.

Prerequisites: MAE 200, ME 232 and 324.

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.

Offered in fall semester of odd years.

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 and 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 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 50 in Bulletin for placement procedures.)

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



Prerequisite: MAE 200.

MATHEMATICS

Professor Tillman, Chairperson; Professor Emeritus Earl; Associate Professor Emeritus DeCosmo; Professors Berard, Koch, Merrill, Wong; Associate Professors Lew, Sullivan; Assistant Professors Bracken, Harrison, Kapolka.

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

Total minimum number of credits required for a major in Mathematics leading to the B.S. degree — 130.

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 or 24.

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 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 and a B.S. program in Computer Information Systems. (See separate listings in this bulletin.)

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 mathematics 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 and Mth 202	12
Electives:	
One of the following courses: Mth 211, 212, 214, 231	3-4
Two of the following courses: Mth 311, 331, 343, 351, 361, 414	6-8
Minimum Total Required	21-24

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	3-4
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 or 24

Recommended Course Sequence for General and Applied Mathematics Tracks

First Semester

	B.A.	B.S.
Mth 111 Calculus I	4	4
Eng 101 Composition or	4	4
Distribution Requirement	3	3
CS 125 Computer Science I	4	4
Distribution Requirements	6	6
PE 100 Activity	0	0
	17-18	17-18

Second Semester

	B.A.	B.S.
Mth 112 Calculus II	4	4
Eng 101 Composition or	4	4
Distribution Requirement	3	3
Distribution Requirements	9	6
Phy 201 General Physics I	—	4
PE 100 Activity	0	0
	16-17	17-18

Third Semester

	B.A.	B.S.
Mth 202 Set Theory and Logic	4	4
Mth 211 Intro. to Ordinary	4	4
Differential Equations		
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 311 Functions of	4	4
a Real Variable		
Mth 351 Probability and	3	3
Mathematical Statistics I		
Distribution Requirement	—	3
Free Electives	9	6
	16	16

Sixth Semester

	B.A.	B.S.
Mth/CS Elective[2]	6	6
Free Electives	9	9
	15	15

Seventh Semester

	B.A.	B.S.
Mth 391 Senior Seminar	1	1
Mth 331 Intro. to		
Abstract Algebra I	4	4
Mth/CS Electives[2]	—	3
Free Electives	12	9
	17	17

Eighth Semester

	B.A.	B.S.
Mth 392 Senior Seminar	2	2
Mth/CS Elective[2]	3	3
Free Electives	9	9
	14	14

[1]See below for the Department's requirements regarding science electives.
[2]See below for the Department's requirements regarding Mth/CS electives.

Recommended Course Sequence for Teacher Certification Mathematics Track

First Semester

	B.A.	B.S.
Mth 111 Calculus I	4	4
Eng 101 Composition or Distribution Requirement	4	4
CS 125 Computer Science I	3	3
Distribution Requirements	4	4
PE 100 Activity	6	6
	0	0
	17-18	17-18

Second Semester

	B.A.	B.S.
Mth 112 Calculus II	4	4
Eng 101 Composition or Distribution Requirement	4	4
Psy 101 General Psychology	3	3
Distribution Requirements	3	3
Phy 201 General Physics I	6	3
PE 100 Activity	—	4
	0	0
	16-17	17-18

Third Semester

	B.A.	B.S.
Mth 202 Set Theory and Logic	4	4
Ed 190 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 200 Educational Psychology	3	3
Science Elective[1]	3	3
Distribution Requirement	3	3
	16	16

Fifth Semester

	B.A.	B.S.
Mth 311** Functions of a Real Variable	4	4
Mth 343* Intro. to Geometry	3	3
Free Electives	4	—
Distribution Requirements	3	6
Ed 210 Multicultural Education	2	2
	16	15

Sixth Semester

	B.A.	B.S.
Mth/CS Electives[2]	3	9
Ed 380 Content Area Reading	2	2
Free Electives	9	4
	14	15

Seventh Semester

	B.A.	B.S.
Mth 303* The Teaching of Mathematics in Secondary School	4	4
Mth 331** Intro to Abstract Algebra I	4	4
Mth 351 Probability and Mathematical Statistics I	3	3
Mth 391 Senior Seminar	1	1
Free Electives	6	6
	18	18

Eighth Semester

	B.A.	B.S.
Ed 390a 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.
**Mth 311 and Mth 331 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 322, EE 241 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	4	4
Phy 201	—	4
Science Electives	6	7
Eng 101	4	4
Distribution Requirements	27	27
Free Electives	41	35
Total	128	130

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	4	4
Phy 201	—	4
Science Electives	6	7
Eng 101	4	4
Ed 190, 200, 210, 380 and 390A	25	25
Proficiency Examination	—	—
Psy 101	3	3
Distribution Requirements	24	24
Free Electives	21	12
Total	128	130

MTH 84. COLLEGE PREPARATORY MATHEMATICS — **Three credits***

Designed for students who need to review basic mathematics skills before taking Mth 94, 101 or 103. 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 94. COLLEGE ALGEBRA — **Three credits**

Designed for students who need to review basic algebra before taking Mth 100 or Mth 150. Topics include polynomials, solution of equations and inequalities, exponents and radicals, graphing, and solution of systems of equations.

Offered every fall and summer.

MTH 100. PRECALCULUS — **Three credits**

A course in advanced algebra and trigonometry designed to prepare students for calculus. Topics include functions, inverse functions, logarithms, exponentials, and trigonometry.

Prerequisite: Mth 94 or 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 107. BUSINESS MATHEMATICS — **Three credits**

Designed for business and accounting majors. Emphasis on mathematical modeling in the business environment. Topics include algebraic functions; mathematics of finance; systems of linear equations; linear programming; average and instantaneous rates of change. Requires the use of a graphics calculator.

Prerequisite: Mth 94 or two years of secondary school mathematics in algebra and geometry.

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: Mth 94 or 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 in spring of even years.

MTH 231. DISCRETE MATHEMATICS **Three credits**

Designed to provide background in discrete mathematics for upper-level courses in computer science. Topics include: basic counting principles; introduction to recurrence relations and their application in analyzing algorithms; basic properties of graphs, trees, and networks; AND, OR, and NOT gates and designing combinatorial circuits, finite-state automata, transducers and Turing machines

Prerequisites: Mth 202 and CS 125
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 in the fall semester of even years.

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 in the fall semester of odd years.

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 in fall of even years.

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 (such as SAS, SPSS, and JMP) 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 even 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. (same as PHY 301)

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. (same as PHY 302)
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 in spring of odd years.

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 50 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 when demand warrants.

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 112, 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

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

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

Mission Statement

The Mechanical Engineering program at Wilkes University is functionally and visionally committed to the particular education and technological needs of the surrounding Northeast Pennsylvania regional area: its population base, its career opportunities, its economic vitality, and its industrial strength and activity.

Cooperative education provides applied professional training to Wilkes engineering students that is often valued by prospective employers. The mechanical engineering curriculum includes an optional twelve-credit cooperative education assignment in the sixth semester. Ordinarily, the assignment will continue into the summer preceding the seventh semester. Since all students may not be willing or able to elect such a cooperative educational assignment, the following options exist: [1] The student may complete six credits of techinical electives and six credits of free electives. [2] The student may secure a six-credit co-op assignment and complete three credits of technical elective and three credits of free electives.

Within this framework the program and its faculty are primarily dedicated to their students in providing an accessible, quality, four-year, baccalaureate education in the field of Mechanical Engineering as a career opportunity. The program is specifically course-arranged and curriculum-structured to have a broad focus that includes design, the thermal sciences, and fluid and solid mechanics, along with a strong manufacturing component. Also, the program is educationally integrated with supportive programs in Materials Engineering and Engineering Management. This combination of mechanics, materials, manufacturing, and management is reflective of a real world, globally competitive technology; is particularly relevent to the interests of regional industry; and will also service the continuing educational needs of technical personnel attached to local industry.

To provide a quality component to this educational framework, the program emphasizes small-sized classes, hands-on laboratory involvement with sophisticated equipment, and direct student-faculty contacts in classroom, project, and research activities. The program also emphasises an engineering design component that coherently increases in complexity and diversity over the entire four-year educational experience. This activity is specifically arranged and integrated into relevant course work to encourage student-faculty contacts, to provide an additional student learning experience, to include topics from local industry and to more fully prepare and train students for the engineering responsibilities typically encountered in the industrial world.

In addition to this educational role, the program is committed to both supporting and expanding the regional economy by being a personnel, equipment, laboratory, and technical resource center for the direct purposes of serving local industry and integrating our students into local engineering activities, particularly in the design component at the advanced course level, and of attracting additional industry to the region.

Program

The Department of Engineering and Physics 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 energy, controls, structures and motion in mechanical systems and manufacturing.

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 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; re-

ceiving 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	MAE 200 Materials Engineering	3
Mth 111 Calculus I	4	Mth 112 Calculus II	4
Egr 111 Introduction to Engineering	3	EE 144 FORTRAN or	3
ME 180 CADD Lab	1	EE 145 Computer Science I	4
Eng 101 Composition	4	Phy 201 General Physics I	4
PE 100 Activity	0	Distribution Requirement	3
	16	PE 100 Activity	0
			17-18
Third Semester		**Fourth Semester**	
Mth 211 Intro. to Differential Equations	4	ME 211 Introduction to Manufacturing	4
EE 211 Circuit Theory I	3	ME 232 Strength of Materials	3
EE 283 Electrical Measurements Lab	1	ME 234 Statics & Dynamics II	3
ME 231 Statics & Dynamics I	3	ME 322 Egr. Thermodynamics	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 321 Fluid Mechanics	3	ME 399 Cooperative Education *or*	12
ME 323 Fluid Mechanics Lab	1	ME 399 Cooperative Education	6
ME 324 Heat and Mass Transfer	3	Technical Elective	3
ME 326 Heat Transfer Lab	1	Free Elective *or*	3
ME Elective	3	Technical Elective	6
Distribution Requirement	6	Free Elective	6
	17		12
Seventh Semester		**Eighth Semester**	
ME 332 Vibration of Dynamic Systems	3	ME 315 Computer Integrated Mfg	3
ME 333 Machine Design	3	ME 392 Senior Projects II	2
ME 335 Egr. Modeling & Analysis	3	EgM 320 Engineering Project Analysis	3
ME 391 Senior Projects I	1	ME 384 Mechanical Design Lab.	1
ME Elective	3	EE 314 Control Systems	3
Distribution Requirements	3	Distribution Requirements	3
	16		15

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. 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 SSE 107.

ME 211. INTRODUCTION TO MANUFACTURING — **Four credits**

An introduction to manufacturing that examines both the traditional processes of milling, turning, forging, casting, etc., and processes associated with advanced technology. Also considered are, dimensioning, tolerances, process plans, accuracy, repeatability quality assurance and quality control. Three hours lecture and one hour of laboratory a week. Fee: $40.

Prerequisite: Junior standing in engineering or consent of instructor.

ME 213. FACTORY SIMULATION — **Three credits**

Introduction to system analysis and simulation, principles of manufacturing and analysis of discrete computer simulation models. Associated laboratory experiments consider commercially available simulation packages and the design and control of a factory simulation. Two hours lecture and two hours laboratory a week. Fee: $40.

Prerequisite: Junior/senior standing in ME.

ME 214. FLEXIBLE MANUFACTURING SYSTEMS — **Three credits**

Flexible Manufacturing Systems (FMS), Computer Aided Manufacturing (CAM) and manufacturing control by computer, involving Numerical Control, Computer Numerical Control, Direct Numerical Control (NC/CNC/DNC), programmable controllers, robotics, automation and visual inspection. Associated laboratory experiments consider the operation of CNC machines, robots, programmable controllers and FMS. Two hour lecture and two hour laboratory a week. Fee: $40.

Prerequisite: Concurrent with or after ME 211.

ME 231. STATICS AND DYNAMICS I — **Three credits**

Statics of particles; including resolution of forces into components, vector sums, concurrent force systems. Statics of rigid bodies and the study of moments. Equilibrium of bodies in two and three dimensions and determination of reactions. Analysis of trusses and frames. Determination of centroids and moments of inertia. Kinematics of particles; including displacement; velocity; and acceleration. Three hours lecture a 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 a week.

Prerequisite: ME 231.

ME 234. STATICS AND DYNAMICS II — **Three credits**

This course continues the development of Newtonian mechanics with application to the motion of free bodies and mechanisms. Topics include: rectilinear motion, vector calculus, particle motion, inertial and rotating reference frames, rigid body motion, rotational dynamics, linear and rotational momentum, work and kinetic energy, virtual work and collision. Three hours lecture a 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 processes and systems. Analytical models of manufacturing processes including: metal removal rate, tool wear, setup and tool change times. Analysis and optimization of manufacturing productivity and throughput. Automation and computer control of manufacturing processes. Three hours lecture a week.

Prerequisite: Junior or senior standing in ME.

ME 315. COMPUTER INTEGRATED MANUFACTURING — **Three credits**

The essentials of Computer Integrated Manufacturing (CIM) for data and manufacturing operations integration. Topics include the components of CIM: Computer Aided Design (CAD), Process Planning (CAPP), Manufacturing (CAM), and Quality Assurance (CAQ). Implementation of CIM into concurrent engineering, axiomatic design, strategy development and prototype evaluation. Also discussed are statistical quality control, networking and integration technology. Three hours lecture a week.

Prerequisite: Senior standing in ME.

ME 316. EXPERT SYSTEMS IN MANUFACTURING — **Three credits**

Examination of a variety of computer models to enhance decision making, forecasting, production planning, process planning, material requirement planning and goal planning. Combination of these models into prototype expert system for planning and control of manufacturing processes. Two hours lecture and two hours laboratory a week. 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. Three hours lecture a week.

Prerequisites: Senior standing in ME.

ME 318. QUALITY CONTROL ENGINEERING — **Three credits**

Quality control in the manufacturing environment, statistical methods used in quality assurance, statistical process control. Three hours lecture a week. (same as EgM 318)

Prerequisite: Mth 150 or consent of instructor.

ME 321. FLUID MECHANICS — **Three credits**

Thermodynamics and dynamic principles applied to fluid behavior and to ideal, viscous, and compressible fluids under internal and external flow conditions. Three hours lecture a week.(same as Phy 213)

Prerequisite: ME 231.

Corequisite: ME 322.

ME 322. ENGINEERING 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. Reversibility and irreversibility. Three hours lecture a week.

Prerequisites: Phy 174 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 a week. Fee: $40.

Prerequisite: Concurrent with 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 a week.
Prerequisites: ME 321-322 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 a week.
Prerequisites: ME 322, ME 324.

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 a week. Fee: $40.
Prerequisite: Concurrent with or after ME 324.

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 hours lecture a week.
Prerequisite: ME 322.

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 a week.
Prerequisite: ME 232.

ME 332. VIBRATION OF DYNAMIC SYSTEMS **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 hours lecture a 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 and design under torsional and combined stresses. Design of bolted connections, fasteners, welds, springs, balled roller bearings, gears, clutches, brakes, belts, and chains. Three hours lecture a week.
Prerequisites: ME 232, ME 332.

ME 334. KINEMATICS **Three credits**
Analysis of planar mechanisms, specifically 4-bar, slider, and multi-link mechanisms. Displacement, velocity, and acceleration of mechanisms are covered through graphical, numerical, and computational methods. Two-position synthesis of the 4-bar mechanism. Basics of the involute gear and standard and nonstandard gears, as well as compound and epicyclic gear trains. Displacement, velocity, and acceleration in the basic design and analysis of cams and followers. Three hours lecture a 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 hours lecture a week.
Prerequisites: EE 144 or EE 145, 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 hours lecture and two hours laboratory a week. Fee: $40.
Prerequisites: ME 232, ME 324.

ME 384. MECHANICAL DESIGN LABORATORY **One credit**
Advanced open-ended laboratory simulating R&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 a 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 50 in Bulletin for placement procedures.)
Prerequisites: Sophomore standing, 2.0 cumulative average, consent of academic advisor, approval of placement by department chairperson.

MEDICAL TECHNOLOGY

(See page 212)

MILITARY SCIENCE (Army ROTC)

Lieutenant Colonel Wetherell, 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. ROTC is a totally flexible program that can be tailored to any individual student, especially those in their freshman and sophomore years.

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. The King's College classes are about a 5 minute walk from the Wilkes University Campus. Two-year and four-year programs 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 a physical examination, and complete either the two- or four-year program of approved Military Science courses.

Most students take one course per semester of the basic course program (freshman and sophomore years), and one course per semester of the advanced course (junior and senior years). All contracted students in the Advanced Course will receive a $150 per month subsistence allowance. Uniforms, equipment, and textbooks required for Army ROTC will be supplied by the Military Science Department. Students may also participate on a voluntary basis in many ROTC related activities. There is physical fitness training and hands-on equipment training during the week. Each semester, there is a social event and at least one weekend of training which includes marksmanship, orienteering, rappelling, and confidence courses. During vacations students can volunteer for regular army training in parachuting, helicopter operations, and mountain climbing. All activities are cost free and cadets are paid to attend some of the training.

The college ROTC Program consists of two courses. The BASIC COURSE consists of the classes given during freshman and sophomore years (MS211, MS212, MS22l, MS222). The ADVANCED COURSE consists of the classes given during the junior and senior years (MS231, MS232, MS241, MS242, MS351). Graduate students enrolled in a two-year program can participate in the Advanced Course. Students in the Basic Courses can compress the training and finish in less than two years; the Advanced Course is a two-year program and cannot be compressed.

To receive an Army Commision, cadets must complete the Advanced Course. Students qualify for advanced ROTC courses (2-year program) in three ways:

(1) **On Campus Basic 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 military training at Fort Knox, Kentucky. The training is educational as well as fun, exciting, and rewarding.

(3) **Advanced Placement** — students who have completed Basic Training in any U.S. service (Army, Navy, Marines, Air Force, Coast Guard) qualify for placement.

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 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 must be made while enrolled in Military Science 222.

Summer Training

While enrolled in the Advanced Courses, each student must attend a five-week leadership assessment training course at an Army Base in the Seattle, Washington Area. This is usually done between the junior and senior years. Transportation, food, lodging, medical and dental care are provided, and the cadet is paid a military salary. The purpose of the camp is to access the cadet's leadership ability and potential.

Financial Incentives

While enrolled in the Advanced Courses, students will receive $150 per month subsistence allowance. Freshman and sophomore students may apply for scholarships. Freshmen can receive 3-year scholarships: sophomores, 2-year. Scholarships pay up to $16,000 in tuition plus $450 a year for books. Scholarship students also get the $150 per month allowance. Also, the ROTC program with its commission as a second lieutenant in the Army can lead to a paying job. The starting salary is nearly $30,000 plus full medical and dental, with 30 days annual leave and assignments at world-wide locations.

Transcript Credits:

The 12 credits earned in Military Science classes can be used as electives; completion of two semesters of MS100 fulfills the requirement for physical education at the University.

Military Science Courses

MS 100. PHYSICAL FITNESS TRAINING — **No credit**

A modern up-to-date program of fitness and health training. The one hour sessions are conducted before classes on Mondays, Wednesdays and Fridays at King's College each week school is in session. The routine consists of stretching and warm-ups, followed by strengthening exercises, concluding with an aerobic workout. Safety is a prime concern and all sessions are supervised by senior military sergeants and officers. This course is requred of all students in the Advanced Course and is to be counted toward the four credit MS PE requirement. **Note: MS 100 may be substituded for the PE 100 series.**

MS 211-212. CONCEPTS OF LEADERSHIP I & II — **One credit each**

Instruction is designed to provide a very basic understanding of military knowlege while concentrating on the leadership skills and civic responsibilities important to all citizens. Students may elect to participate in many activities that produce expertise in rappelling, orienteering, first aid, swimming and marksmanship. 1 hour per week for 2 semesters.

MS 221-222. DYNAMICS OF LEADERSHIP I & II — **Two credits each**

Instruction designed to familiarize the student with basic military operations and the principles of leadership. Students experience hands-on training with navigation and topographic equipment, first-aid (including CPR) procedures and military weapons. 2 hours per week for 2 semesters.

MS 231-232. MILITARY LEADERSHIP I & II — **Two credits, one credit**

Instruction is designed to continue the development of leadership qualities and technical skills required in the military. Students teach freshmen and sophomores to use equipment and are graded in positions of responsibility and leadership. Students learn to plan, resource, and execute effective training. The goal of this junior year is to prepare the student to excel at the leadership assessment camp prior to their senior year.

Prerequisite: Advanced Course placement credit.

MS 241-242. ADVANCED MILITARY LEADERSHIP 1 & II — **Two credits, one credit**

Instruction is designed to prepare students to function as members of a military staff and concurrently continues leadership development. The Professor of Military Science teaches this course and mentors students prior to their first military assignment. The course covers briefing techniques, effective writing, army training systems, and the logistical and administrative support of military operations.

MS 251. LEADERSHIP APPLICATION LABORATORY — **No credit**

Freshmen and Sophomores are encouraged to participate in this elective each semester. "Hands-on" instruction is designed to reinforce classroom training on weapons, first aid, tactics, leadership and military drill. Advanced Course Students instruct under the Supervisor of Military cadre.

NOTE: Candidates for an Army commission through Military Science are required by regulation to complete academic courses in the areas of written communication skills, human behavior, military history, computer literacy, and math reasoning. Generally, these requirements will be met by satisfying the General Education Requirements. Contact the Professor of Military Science for specific requirements.

Students can contact the counselors in the Military Science Department at:

Tel: (717) 941-7457
Fax: (717) 941-4340
E-mail: ROTC@UofS.edu

Students can also visit our HOME PAGE in the academic section of:
http://www.UofS.edu

MUSIC

Adjunct Professor Harrington, Chairperson; Professor Emeritus Chapline; Associate Professor Emeritus Garber; Associate Professors Flint, Reiprich; Assistant Professor Turner; Visiting Assistant Professor Lieberman; Adjunct Faculty Dent, Fish, Fidyk, Greenwald, Groat, Hanisch, Heinze, Lugiano, Millington, Mizuguchi, Nowak, Pryor, Sanderson, Sapadin, Sprengelmeyer, Teubner.

Total minimum number of credits required for a major in Music leading to the B.M. degree — number varies with program.

Purposes

The Department of Visual and Performing Arts offers Bachelor of Music degree programs in applied performance and in music education; students who successfully complete the requirements for the B.M. in Music Education are candidates for teacher certification in music, K-12. The degree programs in music

1. offer students a comprehensive exposure to all aspects of musical training relative to the area of degree specialization;
2. prepare students for a wide variety of contemporary careers in music; and
3. offer substantive preparation 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 general academic background, are qualified to pursue work at the university level.

Certain criteria are recognized as basic to any curriculum in music and are addressed by way of 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. Students majoring in Music will pay additional fees for the major and for applied performance courses.

Recommended Course Sequence for Bachelor of Music – Applied Voice Major

Program completed with 127 semester credits.

First Semester

Mus 000 Recital Attendance	0
Med 010 Functional Piano	0
Mus 100 Applied Performance	2
Mus 103 Comp. Musicianship I	2
Mus 105 Harmonic Foundations I	3
Mus 101 Introduction to Music	3
Mus 121 or 131 Ensemble (Minor)	½
Mus 125 Ensemble (Major)	½
Eng 101 Composition or Distribution Requirement	4
Foreign Language	3
PE 100 Activity	0
	17-18

Second Semester

Mus 000 Recital Attendance	0
Med 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 101 Composition or Distribution Requirement	4
Foreign Language	3
PE 100 Activity	0
	17-18

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
Free Elective	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
Med 010 Functional Piano	0
Mus 100 Applied Performance	2
Mus 103 Comp. Musicianship I	2
Mus 105 Harmonic Foundations I	3
Mus 101 Introduction to Music	3
Mus 121 or 131 Ensemble (Major)	½
Mus 125 Ensemble (Minor)	½
Eng 101 Composition or Distribution Requirement	4
Distribution Requirement	3
PE 100 Activity	0
	17-18

Second Semester

Mus 000 Recital Attendance	0
Med 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 101 Composition or Distribution Requirement	4
Distribution Requirement	3
PE 100 Activity	0
	17-18

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	3
Free Elective	6
	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 101 Introduction to Music	3
Mus 121 or 131 Ensemble (Minor)	½
Mus 125 Ensemble (Major)	½
Eng 101 Composition or Distribution Requirement	4
Distribution Requirement	3
PE 100 Activity	0
	17-18

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 101 Composition or Distribution Requirement	4
Distribution Requirement	3
PE 100 Activity	0
	17-18

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	3
	14½

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

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	7
	16½

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
Med 010	Functional Piano	0
Mus 100	Applied Performance (Major)	2
Mus 103	Comp. Musicianship I	2
Mus 105	Harmonic Foundations I	3
Mus 101	Introduction to Music	3
Mus 121 or 131	Ensemble (Minor)	½
Mus 125	Ensemble (Major)	½
Eng 101	Composition or Distribution Requirement	4
	Distribution Requirement	3
PE 100	Activity	0
		17-18

Second Semester

Mus 000	Recital Attendance	0
Med 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 101	Composition or Distribution Requirement	4
	Distribution Requirement	3
PE 100	Activity	0
		17-18

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 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
	Distribution Requirement	3
		16

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 190	Effective Teaching	3
	Free Electives	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
Ed 200	Educational Psychology	3
	Distribution Requirements	6
	Free Elective	3
		15½

Seventh Semester

Mus 000	Recital Attendance	0
Mus 125	Ensemble (Major)	½
Med 351	Teaching of Sec. Choral Music*	2
Med 352	Teaching of Sec. Instr. Music*	2
Mus 400	Applied Performance (Major)	2
Med 360	Intern Teaching of Music	11
		17½

Eighth Semester

Mus 000	Recital Attendance	0
Mus 125	Ensemble (Major)	½
Med 254-257	Instrumental Methods*	2
Mus 400	Applied Performance (Major)	2
Mus 401	Recital	0
	Distribution Requirements	9
	Free Elective	3
		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

Mus 000	Recital Attendance	0
Med 010	Functional Piano	0
Mus 100	Applied Performance (Major)	2
Mus 103	Comp. Musicianship I	2
Mus 105	Harmonic Foundations I	3
Mus 101	Introduction to Music	3
Mus 121 or 131	Ensemble (Major)	½
Mus 125	Ensemble (Minor)	½
Eng 101	Composition or Distribution Requirement	4
		3
	Distribution Requirement	3
PE 100	Activity	0
		17-18

Second Semester

Mus 000	Recital Attendance	0
Med 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 (Major)	½
Mus 125	Ensemble (Minor)	½
Eng 101	Composition or Distribution Requirement	4
		3
	Distribution Requirement	3
PE 100	Activity	0
		17-18

Third Semester

Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Major)	½
Mus 125 Ensemble (Minor)	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 254 Instrumental Methods	2
Psy 101 General Psychology	3
	18

Fifth Semester

Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Major)	½
Med 256 Instrumental Methods	2
Mus 300 Applied Performance (Major)	1
Mus 300 Applied Performance (Minor)	1
Med 250 Teaching of Elementary Music	2
Ed 190 Effective Teaching	3
Free Electives	6
	15½

Seventh Semester

Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Major)	½
Mus 400 Applied Performance (Major)	2
Med 351 Teaching of Sec. Choral Music*	2
Med 352 Teaching of Sec. Instr. Music*	2
Med 360 Intern Teaching in Music	11
	17½

*Accelerated courses.

Fourth Semester

Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Major)	½
Mus 125 Ensemble (Minor)	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
Med 255 Instrumental Methods	2
Mus 262 Instrumental Conducting II	2
Distribution Requirement	3
	18

Sixth Semester

Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Major)	½
Med 257 Instrumental Methods	2
Mus 300 Applied Performance (Major)	1
Mus 300 Applied Performance (Minor)	1
Med 202 Practicum in Music Education	1
Ed 200 Educational Psychology	3
Distribution Requirements	6
	14½

Eighth Semester

Mus 000 Recital Attendance	0
Mus 121 or 131 Ensemble (Major)*	½
Mus 400 Applied Performance (Major)	2
Mus 401 Recital	0
Distribution Requirements	9
Free Elective	3
	14½

Music

MUS 000. RECITAL ATTENDANCE — **No credit**

This course is required each semester for all music majors. Degree requirement for graduation.

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. Additional fees apply.

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 I	Voice	Section P	Bass
Section B	Clarinet	Section J	Baritone Horn	Section Q	Percussion
Section C	Oboe	Section K	Trombone	Section R, S, T	Piano
Section D	Bassoon	Section L	Tuba	Section U	Organ
Section F	Saxophone	Section M	Violin	Section V	Guitar
Section G	Trumpet	Section N	Viola	Section X, Y	Voice
Section H	French Horn	Section O	Cello	Section Z	Drum Set

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 108, 207-208. HISTORICAL ANALYSIS OF MUSIC I-III — **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. CHAMBER 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, successful completion of Piano Proficiency Examination 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 50 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 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.

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.

Prerequisite: Successful completion of Piano Proficiency Examination.

MED 254-257. 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. Woodwind Methods
MED 255. Brass Methods
MED 256. String Methods
MED 257. Percussion 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.

Prerequisites: Minimum cumulative gpa of 2.5; Ed 190 (Effective Teaching) minimum grade of 2.5; Ed 200 (Educational Psychology); and approval of music faculty.



NURSING

Associate Professor Merrigan, Chairperson; Associate Professor Emerita Druffner; Associate Professors Castor, Schreiber, Telban; Assistant Professors Slusser, Zbegner, Zielinski; Visiting Assistant Professor Reishtein; Adjunct Faculty Babcock.

Total minimum number of credits required for a major in Nursing leading to the B.S. degree — 127.

ACCREDITATION

The baccalaureate program in Nursing is approved by the Pennsylvania State Board of Nurse Examiners and is accredited by the National League for Nursing (see page 14).

The Wilkes University Department of Nursing has been granted preliminary approval by the Commission on Collegiate Nursing Education. Preliminary approval is a form of initial recognition offered by CCNE provided to baccalaureate and graduate nursing education programs during the transitional phase of the development of the CCNE accreditation process. Programs seeking this category of recognition had until December 1, 1997 to apply for preliminary approval, which was granted by CCNE in early 1998. Preliminary approval is not accreditation and extends until the program's first scheduled comprehensive accreditation review. Preliminary approval is designed to be a temporary status and provides an indication that programs have been reviewed by the Commission and have met, at least, the following general requirements:

The nursing education program is viable and appears, based upon the review of submitted materials, to be conducted in a manner that will enable eventual compliance with CCNE accreditation standards.

The institution has a history of seeking and ensuring continuing accreditation and program recognition by appropriate accrediting and regulatory agencies.

The institution has ensured the continuing viability of the nursing education program by being responsive to the concerns of accrediting and regulatory agencies

For further inforrmation about the preliminary approval status of the program, please contact the Commission on Collegiate Nursing Education at the following address:

Commission on Collegiate Nursing Education
One Dupont Circle, NW, Suite 530, Washington, DC 20036-1120 (202) 887-6791

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 Education 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 Nursing Learning Resource Center, which is equipped with audio-visual and computer-assisted 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 placement 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 and to determine their placement status before they can be accepted into the Wilkes nursing program.

RN-MS Program

This program is designed for the experienced, practicing professional who plans to earn a master's degree as a clinical nurse specialist. Acceleration through the baccalaureate portion of the program allows this professional to enter into advanced practice efficiently.

For details and enrollment information, contact the Director of the Master's program in Nursing.

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	
Nsg 171 Health Care Terminology	1	Bio 113 Microbiology	4
Bio 115 Human Anatomy and Physiology I	4	Bio 116 Human Anatomy and Physiology II	4
Eng 101 Composition or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
Psy 101 General Psychology or	3	Psy 101 General Psychology or	3
Soc 101 Intro. to Sociology or		Soc 101 Intro. to Sociology or	
Ant 101 Intro. to Anthropology*		Ant 101 Intro. to Anthropology*	
Distribution Requirement	3	Distribution Requirement or Soc 251	3
PE 100 Activity	0	PE 100 Activity	0
	14-15		17-18
Third Semester		**Fourth Semester**	
Nsg 200 Principles of Normal Nutrition	3	Nsg 202 Nursing Care of the Growing Family	8
Nsg 201 Principles of Nursing	6	GES 242 Environmental Health	4
Soc 251 Sociology of Minorities or Distribution Requirement	3	Psy Elective	3
Phy 170 Concepts in Physics and Chemistry	4		15
	16		
Fifth Semester		**Sixth Semester**	
Nsg 203 Nursing Care of the Adult Client I	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	3
	17		14

*Please note students must take Eng 101 and both Psy and Soc/Ant 101 during their freshman year.
**Please note: Math 150 is required and prerequisite to Nsg 305.

NSG 171. HEALTH CARE TERMINOLOGY **One credit**
This course is designed to have students study terms common to the health care professions. The emphasis is on analysis and understanding rather than on memorization.

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.
Corequisite: Nsg 201.

NSG 201. PRINCIPLES OF NURSING **Six credits**

This course introduces the student to the profession of nursing. Use of the nursing process is emphasized in meeting the basic human needs of clients within their communities. Nursing theory is correlated with clinical practice in the Nursing Learning Resource Center and selected clinical agencies. Designated Writing Intensive. Hours weekly: 4 hours class, 1 hour discussion, 3 hours clinical practice. Fee: $80.

Prerequisites: Bio 113, Bio 116, Psy 101, Soc 101/Anthro 101, Eng 101, Nsg 171.
Corequisites: Nsg 200, Phy 170, Soc 251.

NSG 202. NURSING CARE OF THE GROWING FAMILY **Eight credits**

The nursing process is utilized in assisting families within their communities to meet their human needs. Nursing theory is correlated with clinical practice in a variety of health care settings. Designated Writing Intensive. Hours weekly: 4 hours class, 12 hours clinical practice. Fee: $80.

Prerequisites: Nsg 200, 201.
Corequisites: GES 242.

NSG 203. NURSING CARE OF THE ADULT CLIENT I **Eight credits**

The nursing process is utilized in assisting adults and their families, within their communities, to achieve optimum health and to resolve selected health problems. Nursing theory is correlated with clinical practice in a variety of health care settings. 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 adults and their families, within their community, to achieve optimum health and to resolve selected medical, surgical, and mental health problems. Nursing theory is correlated with clinical practice in a variety of health care settings. Designated Writing Intensive. 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 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 majors or 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.

Prerequisites: Junior and Senior Nursing majors or Registered Nurses.

NSG 274. DIMENSIONS IN HEALTH AND WELLNESS **Three credits**

This elective course provides a framework for the exploration of the concepts of holistic health, wellness, and alternative health care modalities through experiential exercises, reading, journaling and lectures. During the course the student will assess his/her personal health and wellness status, develop a plan to modify a specified health behavior, implement the plan using a variety of holistic modalities, and evaluate the outcome of the plan. This is a wellness elective appropriate for any student at any level. Lecture, discussion, class participation. No prerequisites. No corequisites. No fees. (same as PE 274).

NSG 299. NURSING FORUM **Six credits**

This course is designed to facilitate the transition of RN students from other educational routes into baccalaureate nursing education. Use of the nursing process is applied throughout the growth and development of clients. Nursing theory is correlated with clinical practice in community settings. Upon successful completion of N299 (6 credits), 24 additional credits, (N202, N203, N204), will be assigned in recognition of work completed. A fee is required before these additional credits are posted. Please see chairperson of the Department of Nursing. Designated Writing Intensive. Hours weekly: 5 hours class, 3 hours clinical practice. Fee: $80.

Prerequisites: RN status or NCLEX eligibility, Eng 101.
Corequisites: Nsg 200 or challenge examination.

NSG 301. NURSING CARE OF THE OLDER ADULT CLIENT **Eight credits**

The nursing process is utilized in the care of the older adult clients within their communities in a variety of settings. Nursing theory is correlated with clinical practice. Designated Writing Intensive. Hours weekly: 4 hours class, 12 hours clinical practice. Fee: $80.

Prerequisite: Nsg 204.

NSG 302. SENIOR PRACTICUM **Eight credits**

This course prepares the student for professional role development in emerging health care delivery systems. The student synthesizes knowledge from all previous nursing and supportive courses to manage care in an area of clinical practice consistent with career goals. Designated Writing Intensive.

Prerequisite: Nsg 301.

NSG 303. CONTEMPORARY ISSUES AND TRENDS IN NURSING **Three credits**

This seminar course explores current issues and trends in nursing and health care. Designated writing intensive (WI) and oral presentation option (OPO).

Prerequisites: Nsg 204 or RN students who have completed Nsg 299.

NSG 305. INTRODUCTION TO NURSING RESEARCH **Three credits**

The research process is examined in this course. Emphasis is placed on studies in nursing which provide a foundation for critical reflection on research reports and application of findings to practice. Designated oral presentation option (OPO). Offered fall semester only.

Prerequisites: Mth 150 and Nsg 204 or RN students who have completed Nsg 299.

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 50 in Bulletin for placement procedures.)

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

NSG 406. HEALTH ASSESSMENT OF THE ELDERLY **Three credits**

This course presents an overview of the health assessment of the older adult client. In most respects the physical assessment of the elderly is no different from the young adult. However, the greater incidence of disease and infirmity 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.

Prerequisites: Permission of instructor.

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

Professor Graham, Dean; Associate Professor Jacobs, Assistant Dean; Professor Kibbe, Chairperson, Department of Pharmaceutical Sciences; Associate Professors Jacobs, P.H. Stepanovich; Assistant Professors Abraham, Culhane, Maize, Sasane, P.L. Stepanovich; Professor Lin, Chairperson, Department of Pharmacy Practice; Assistant Professors Malinowski, McKinzie, Snyder, Sparano, Tran.

The School of Pharmacy ofers a program of professional study leading to one degree, the Doctor of Pharmacy (Pharm.D.) degree. The School of Pharmacy at Wilkes accepted its first students for the fall 1996 semester. The University is committed to successfully pursue full accreditation of this new program with the American Council on Pharmaceutical Education. The accreditation process has been initiated. For further information on accreditation, please see the discussion under School of Pharmacy elsewhere in this Bulletin.

The four-year professional program leads to the doctor of pharmacy degree. It is the purpose of this program to prepare Wilkes graduates for successful pharmacy practice in the health care environment of the twenty-first century. Graduates of this program will be prepared for pharmacy practices in a variety of settings including hospitals, outpatient clinics, retail pharmacies and managed care organizations. For some time now, the U.S. health care system has been undergoing rapid, even dramatic, change. This transformation process is expected by most observers to continue for some time. Those individuals and organizations responsible for the delivery of pharmaceutical care have not been and will not be sheltered from the forces of change. It becomes necessary, therefore, to provide new practitioners with a knowledge base and skills geared for a transformed health care system.

With the rapid transformation of health care delivery, a strong foundation in the basic sciences (e.g., pharmaceutics, pharmacology, medicinal chemistry, anatomy and physiology) remains essential while clinical knowledge (e.g., therapeutics, pharmacokinetics, pathophysiology) and skills (e.g. physical assessment, patient counseling, clinical decision-making) become even more important. Successful practice will demand an improved understanding of the social sciences (e.g., psychology, sociology, economics, health policy, management). Perhaps most importantly, the future pharmacy practitioner must be even better at working with people. Good communication skills, including the ability to listen and empathize, become a requirement for effective practice.

ADMISSION INTO THE PROFESSIONAL PROGRAM

To be admitted into the professional program of the School of Pharmacy, a student must have either enrolled and successfully completed the ***prepharmacy*** program at Wilkes University as outlined in the **Prepharmacy Program** description found elsewhere in this Bulletin or have submitted a successful ***application*** to the School of Pharmacy.

Historically, there have been more applicants than available positions. This requires the faculty to select from among the applicants those who will have the best opportunity to complete the curriculum and have productive professional lives. Admission is based upon the student's academic ability as reflected in prepharmacy courses, PCAT scores, and references, as well as a successful interview. Each spring a select group of applicants are invited for a series of interviews. Selection for interview is based upon complete evaluation of all submitted application materials. Wilkes University students will be given priority over students from other institutions. Any missing documentation will compromise the application.

HOW TO APPLY

Applicants must obtain an application for School of Pharmacy admission from the School of Pharmacy and return the completed application to the School of Pharmacy. Please note that this is not the same as the Wilkes University application obtained from the University's admissions office. **Completed School of Pharmacy applications must be returned to the School of Pharmacy by February 1, 2000.** To obtain a School of Pharmacy application you may call or write:

School of Pharmacy
Wilkes University
Wilkes-Barre, PA 18766
(570) 408-4280
1-800-WILKESU ext. 4280
pharm@wilkes2.wilkes.edu

PHARMACY MINIMUM ADMISSION REQUIREMENTS

(Enrollment Limit: 65)

To be considered for admission to the School of Pharmacy, the applicant must:

- complete the Wilkes University General Education course requirements or have completed a baccalaureate degree;
- complete the following **Pharmacy prerequisite courses** by the end of the spring 2000 term:
  two semesters (8 credits) of general chemistry with labs;
  two semesters (8 credits) of organic chemistry with labs;
  two semesters (8 credits) of general biology with labs;
  one semester (4 credits) of calculus;
  one semester (3 credits) of statistics;
  one semester (3 credits) of general physics with lab; and
  one semester (3 credits) of microeconomics.
- (for Wilkes students) have a minimum overall GPA of 2.50 and a minimum GPA of 2.50 in the pharmacy prerequisites listed above;

- (for non-Wilkes students) have a minimum overall GPA of 2.75 and a minimum GPA of 2.75 in the pharmacy prerequisites listed above;
- (all applicants) obtain a grade of C (2.0) or better in each of the pharmacy prerequisite courses;
- provide three completed recommendation forms;
- successfully complete two interviews;
- demonstrate acceptable written communication skills;
- take a standardized test of critical thinking skills; and
- submit his or her score on the Pharmacy College Admission Test (PCAT) by February 1, 2000.

Admission under Special Circumstances

Students enrolled in the professional program of another accredited College/School of Pharmacy may apply to transfer to the Wilkes University School of Pharmacy. Interested students must supply the following materials to the Assistant Dean of the School of Pharmacy:

- A letter certifying good standing by the dean of the college of pharmacy previously attended
- An official transcript(s) showing that the prepharmacy requirements of Wilkes University have been completed; and
- A letter to the Assistan Dean requesting evaluation of class standing.

Professional Standards

Students enrolled in the programs of the College of Pharmacy are expected to endorse professional standards by subscribing to the Oath of the Pharmacist. Students are also expected to abide by the American Pharmaceutical Association's Code of Ethics of the Profession.

Progression Requirements

All students in the professional program of the School of Pharmacy are required to meet minimum standards for academic progression. Progression requirements include a minimum semester and a cumulative pharmacy GPA of 2.0. In addition, no student shall be allowed more than 9.0 credits of less than 2.0 grades in required professional courses both inside and outside of the School. Any course with a grade of 0 must be repeated. At the end of each semester the progress of each student in the professional program will be reviewed. Students failing to meet minimal academic standards at the end of any semester must petition the Student Review Subcommittee through the Assistant Dean to further progress in the School. Policies adopted within these guidelines are distributed to all students in the professional program.

Experiential Curriculum Component

As the experiential portion of the curriculum begins in the second professional year (P-2), all students are requried to possess professional liability insurance and to have had certain vaccinations upon entering the P-2 year.

The fourth professional year (P-4) of the pharmacy program is devoted entirely to clerkship training in a variety of patient-care sites (e.g. hospitals, clinics, and pharmacies). Each student will be assigned by the School to six clerkships, some of which may be at some distance from the Wilkes campus. Prior to entering clerkships, students must have completed all didactic pharmacy course work, be certified in Basic Cardiac Life Support and in Basic First Aid, possess professional liability insurance and have had certain vaccinations.

During the clerkships, students are requried to complete, at minimum, 40 contact hours per week of practice experience in a variety of health care settings. Since patient care is a continuous activity, off-campus clerkship experiences may be conducted outside the traditional workday (shift work). Note also that some clerkship start and end dates will not adhere strictly to the regular University calendar. The student is responsible for paying all transportation and housing costs.

The School of Pharmacy reserves the right to revise the Pharmacy curriculum at any time in order to prepare students for future practice roles, meet new accreditation requirements and to incorporate innovations in instruction.

Prepharmacy Program

The two-year, prepharmacy course sequence is intended to prepare the student for the challenges of Wilkes University's four year Doctor of Pharmacy curriculum. Students enrolled in the prepharmacy program must successfully complete all of the requirements for prepharmacy. The prepharmacy program at Wilkes University is offered through the School of Arts, Sciences and Professional Studies and is outlined below. 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 for assistance in identifying prepharmacy requirements for other institutions.

PREPHARMACY MINIMUM ADMISSION REQUIREMENTS
(Enrollment Limit: 80)

To be considered for admission to prepharmacy the applicant must:

- Be a graduate of, or be near graduation from, an accredited high school or academy;
- Rank in the upper half of his/her class;
- Have attained an SAT minimum of 1000;

- Complete the Wilkes University School of Pharmacy Prepharmacy Application. (This is separate from the Wilkes University Admissions Application);
- Submit two teacher recommendations and one recommendation from a pharmacist;
- Successfully complete an interview within the School of Pharmacy.

Students enrolled in theWilkes University Prepharmacy program who meet the following conditions are automatically admitted to the professional pharmacy program:

- Maintain full-time enrollement at Wilkes University for at least four semesters;
- Complete the General Education requirements;
- Maintain an overall grade point average of 3.0 or better;
- Complete all pharmacy prerequisites (listed below) at Wilkes University with an overall grade point average of 3.0 or better as calculated at the time of completion of prepharmacy. A grade of 2.0 or better must be obtained in each prerequisite course;
- Take the Pharmacy College Admissions Tests (PCAT) and earn a composite score at the 25th percentile or better.

Pharmacy prerequisites

Two semesters (8 credits) of General Chemistry with labs

Two semesters (8 credits) of Organic Chemsitry with labs

Two semesters (8 credits) of General Biology with labs

One semester (4 credits) of Calculus

One semester (3 credits) of Statistics

One semeester (4 credits) of General Physics

One semester (3 credits) of Microeconomics

Students in the Wilkes University Prepharmacy program who do not meet these prerequisites must compete for available seats in the professional program. These students and other Wilkes University students will be given priority over students from other institutions for the remainder of the 65 seats.

RECOMMENDED COURSE SEQUENCE FOR PREPHARMACY*

FIRST SEMESTER		SECOND SEMESTER	
Eng 101 Composition or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
Bio 121 Principles of Modern Biology I	4	Bio 122 Principles of Modern Bio II	4
Chm 115 Elements and Compounds	4	Chm 116 The Chemical Reaction	4
PE 100 Activity	0	PE 100 Activity	0
Distribution Requirement	6	Distribution Requirements	6
	17-18		17-18

THIRD SEMESTER		FOURTH SEMESTER	
Chm 231 Organic Chemistry I	4	Chm 232 Organic Chemistry II	4
COM 101 Fundamentals of Speech	3	CS/EE 265 Medical Informatics	3
Ec 102 Principles of Economics II	3	Phy 174 Classical and Modern Physics	4
Mth 105 Calculus for Life, Managerial, and Social Sciences I	4	Mth 150 Elementary Statistics	3
Distribution Requirement	3	Distribution Requirement	3
	17		17

*Some requirements may be satisfied via satisfactory achievement on advanced placement tests or Wilkes's challenge exams.

THE DOCTOR OF PHARMACY PROGRAM

RECOMMENDED COURSE SEQUENCE FOR PROFESSIONAL PROGRAM

P-1 FALL SEMESTER		P-1 SPRING SEMESTER	
PHA 301 Found. of Pharm. Practice I	2	PHA 302 Pharmaceutical Care Lab I	1
PHA 311 Pharmaceutics I	4	PHA 304 Found. of Pharm. Practice II	2
PHA 327 Medical Microbiology	4	PHA 308 Pharm. & Health Care Delivery	3
PHA 331 Anatomy/Physiology I	4	PHA 310 Clinical Research Design	3
PHA 365 Medical Biochemistry	4	PHA 312 Pharmaceutics II	4
	18	PHA 332 Anatomy & Physiology II	4
			17

P-2 FALL SEMESTER		P-2 SPRING SEMESTER	
PHA 401 Pharmaceutical Care Lab II	1	PHA 402 Pharmaceutical Care Lab III	1
PHA 403 Pharmacy Experience	1	PHA 408 Economic Evaluation of Pharm.	3
PHA 405 Pharmaceutical Care Systems	2	PHA 410 Biotechnology/Immunology	3
PHA 411 Biopharm/Clinical Kinetics	4	PHA 426 Pharmacotherapeutics IV	2
PHA 421 Pharmacotherapeutics I	2	PHA 428 Pharmacotherapeutics V	4
PHA 423 Pharmacotherapeutics II	2	PHA 430 Pharmacotherapeutics VI	2
PHA 425 Pharmacotherapeutics III	3	Professional Elective	3
Professional Elective	3		18
	18		

P-3 FALL SEMESTER		P-3 SPRING SEMESTER	
PHA 501 Pharmaceutical Care Lab IV	1	PHA 502 Pharmaceutical Care Lab V	1
PHA 503 Longitudinal Care I	1	PHA 504 Longitudinal Care II	1
PHA 505 Pharmacy Law	2	PHA 526 Pharmacotherapeutics X	2
PHA 507 Mgt. of Pharm. Operations	3	PHA 528 Pharmacotherapeutics XI	2
PHA 521 Pharmacotherapeutics VII	2	PHA 530 Pharmacotherapeutics XII	4
PHA 523 Pharmacotherapeutics VIII	4	PHA 532 Alternative Medicine/Nutrition	3
PHA 525 Pharmacotherapeutics IX	2	Professional Elective	3
Professional Elective	3		16
	18		

P-4 CLERKSHIP YEAR

PHA 510 Medicine	6 weeks	6
PHA 511 Ambulatory Care	6 weeks	6
PHA 512 Community Practice	6 weeks	6
PHA 513 Rural Practice	6 weeks	6
Elective Clerkships	2 @ 6 weeks	12
		36

SCHOOL OF PHARMACY COURSE DESCRIPTIONS

PHA 301 & PHA 304. FOUNDATIONS OF PHARMACY PRACTICE **Two credits each**
Pharmaceutical care in the health care delivery system of the 21st century is addressed. Topics include the history of pharmacy, pharmaceutical care, health and illness behavior, health care ethics, medical terminology, communication skills, team building and team leadership. Lecture: Two hours per week.

Prerequisite: P-l standing.

PHA 302, 401, 402, 501, 502. PHARMACEUTICAL CARE LAB I - V **One credit each**
A five semester sequence designed to challenge students to apply classroom pharmaceutical knowledge and abilities at increasingly higher levels of sophistication. Many of the exercises will serve as a basis for formal assessment of the student's professional competency. Laboratory: Three hours per week.

Prerequisite: P-l, P-2 or P-3 standing as appropriate for each laboratory.

PHA 308. PHARMACEUTICAL AND HEALTH CARE DELIVERY **Three credits**
Examination of health and pharmaceutical delivery in the U.S. conducted from a societal perspective. Emphasis is on public policy, economic behavior and outcomes. Application will be made to various pharmaceutical sectors (e.g., retail, health systems, manufacturing). Students should gain an understanding of the factors driving transformation of health care delivery and the implications for future pharmacy practice. Lecture: Three hours per week.

Prerequisite: EC102 or equivalent and P-l standing or consent of instructor.

PHA 310. CLINICAL RESEARCH AND DESIGN **Three credits**
Application of research design concepts and statistical techniques to design, critically analyze and interpret preclinical, clinical and economic studies of pharmaceuticals and treatment plans. Lecture: Three hours per week.

Prerequisite: MTH 150 or equivalent and P-1 standing or consent of instructor.

PHA 311 & PHA 312. PHARMACEUTICS I & II **Four credits each**
The study and application of physico-chemical principles that are necessary for the design, development and preparation of pharmaceutical dosage forms. The study of quantitative skills necessary for an understanding of the basic and clinical pharmaceutical sciences, including skills in pharmaceutical calculations and extemporaneous preparation of dosage forms. Lecture: Three hours per week. Laboratory/Recitation: Three hours per week. Fee: $40

Prerequisite: P-1 standing or consent of instructor. PHA 311 is a prerequisite for PHA 312.

PHA 327. MEDICAL MICROBIOLOGY **Four credits**
An overview of microbiology with special emphasis on pathogenic microbiology. Lecture: Three hours per week. Laboratory: Three hours per week. Fee: $40. Cross listed with BIO 327.

Prerequisite: P-1 standing or consent of instructor.

PHA 331 & PHA 332. MEDICAL ANATOMY & PHYSIOLOGY I & II Four credits each

In-depth principles of human anatomy and physiology as well as an introduction to pathophysiology will be presented. Lecture: Three hours per week. Laboratory/Recitation: Three hours per week. Fee: $40. Cross listed with BIO 331 & BIO 332.

Prerequisite: P-1 standing or consent of instructor. PHA 331 is a prerequisite for PHA 332.

PHA 365. MEDICAL BIOCHEMISTRY **Four credits**
Introduction to basic biochemistry concepts, focusing on the structure and function of vitamins, proteins, and lipids as well as bioenergetics and major catabolic pathways. The catabolism of carbohydrates, fats and amino acids will be discussed including reactions and regulation. Common metabolic pathways of drugs, enzyme induction and metabolism down regulation will also be presented. Lecture: Four hours per week. Cross listed with CHM 365.

Prerequisite: P-1 standing or consent of instructor.

PHA 403. PHARMACY EXPERIENCE **One credit**
This course will provide introductory practice experiences to students in a variety of practice settings. This early experience is critical to the process of professional socialization which can only develop via interactions with faculty members, practitioners, peers and other health care professionals. Students will spend three hours per week in a structured, supervised learning process in an in-patient or out-patient setting.

Prerequisite: P-2 standing.

PHA 405. PHARMACEUTICAL CARE SYSTEMS: DESIGN & CONTROL Two credits
Examines delivery of pharmaceutical products and services from a systems perspective in a variety of patient care settings. Focus is upon effectiveness, efficiency and quality. Covers design of systems, establishment and monitoring of key indicators, total quality management and quality assurance agencies (e.g., JCAHO, NCQA). Lecture: Two hours per week.

Prerequisite: P-2 standing or consent of instructor.

PHA 408. ECONOMIC EVALUATION OF PHARMACEUTICAL PRODUCTS & SERVICES **Three credits**
Introduction to commonly used economic evaluation methods (e.g., cost-minimization, cost-utility, cost-benefit, cost-effectiveness) as applied to pharmaceutical products and services. Quality of life and outcomes research will also be explored. Emphasis is on understanding evaluation methods and research design and interpreting the relevant literature for practice applications. Lecture: Three hours per week.

Prerequisite: EC 102 and P-2 standing or consent of instructor.

PHA 410. IMMUNOLOGY/BIOTECHNOLOGY **Three credits**
A discussion of nonspecific host defense mechanisms and a detailed description of specific immunity. Products that impart artificial active and passive immunity are presented. The concept of biotechnology is discussed together with the currently available products of genetic engineering that relate to immunology. The various immunological disorders and the immunology of cancer and HIV are discussed. Lecture: Three hours per week.

Prerequisite: PHA 331,332, 365 and P-2 standing or consent of instructor.

PHA 411. BIOPHARMACEUTICS & CLINICAL PHARMACOKINETICS Four credits
The fundamentals of biopharmaceutics and pharmacokinetics are presented. The physical and chemical properties of the drug and dosage form and the impact of the route of administration and patient characteristics and disease state will be related to the absorption, distribution, metabolism and elimination in the body. Individual drugs and patient case histories will be used to familiarize the student to practice. Lecture: Three to four hours per week. Recitation: zero to three hours per week.

Prerequisite: PHA 311, PHA 312 and P-2 standing or consent of instructor.

PHA 421, 423, 425, 426, 428, 430, 521, 523, 525, 526, 528, 530
PHARMACOTHERAPEUTICS

A four semester, twelve module sequence (three modules per semester) integrating pharmacology, medicinal chemistry, pathophysiology and therapeutics. Team-taught. Provides an opportunity to learn, observe and apply concepts from these four disciplines in an integrated manner. Builds a foundation for disease management. Topics and associated credits for each module are as follows:

PHA 421 Pharmacotherapeutics I:
Principles of Pharmacology & Medicinal Chemistry — Two credits
PHA 423 Pharmacotherapeutics II: Principles of Pathophysiology & Therapeutics — Two credits
PHA 425 Pharmacotherapeutics III: Self-Care and Dermatology — Three credits
PHA 426 Pharmacotherapeutics IV: Gastrointestinal Disorders — Two credits
PHA 428 Pharmacotherapeutics V: Infectious Diseases — Four credits
PHA 430 Pharmacotherapeutics VI: Hematology, Joint Disorders, Surgery — Two credits
PHA 521 Pharmacotherapeutics VII: Pulmonary Disorders — Two credits
PHA 523 Pharmacotherapeutics VIII: Cardiovascular Disorders — Four credits
PHA 525 Pharmacotherapeutics IX: Renal Disorders — Two credits
PHA 526 Pharmacotherapeutics X: Endocrine Disorders & Women's Health Issues — Two credits
PHA 528 Pharmacotherapeutics XI: Neoplastic Diseases — Two credits
PHA 530 Pharmacotherapeutics XII: Central Nervous System Disorders — Four credits

Prerequisite: PHA 310, 327, 331, 332, 365 and P-2 or P-3 standing as appropriate for each module.

PHA 450. NEUROPHARMACOLOGY OF DRUGS OF ABUSE — **Three credits**

In-depth analysis of drugs of abuse, including pharmacokinetics, pharmacodynamics, tolerance, sensitization, physical dependence, and effects of drug use during pregnancy. Drug testing and substance abuse treatment strategies will also be discussed. Lecture: Three hours.

Prerequisite: PHA 421 and P-2 standing or consent of instructor

PHA 503 and PHA 504. LONGITUDINAL CARE LAB I & II — **One credit each**

Students will follow a patient or patients over an extended period of time in a medical or home setting. Pharmaceutical knowledge and skills will be applied in communications, health assessment, monitoring of pharmacotherapy, evaluation of both humanistic and clinical outcomes. Issues of health care, cost access and quality as revealed through each patient's interaction with health and pharmaceutical care systems will be addressed. Three hours per week.

Prerequisite: P-3 standing.

PHA 505. PHARMACY LAW — **Two credits**

The study of Federal and state statutes, regulations and court decisions which control the practice of pharmacy and drug distribution. Civil liability in pharmacy practice and elements of business and contract law will be covered. Lecture: Two hours per week.

Prerequisite requisite: P-3 standing or consent of instructor.

PHA 507. MANAGEMENT OF PHARMACY OPERATIONS — **Three credits**

The principles of management, including personnel and financial management, will be covered as they apply to management of pharmacy operations in a variety of settings (e.g., community, health system, managed care). Lecture: Three hours per week.

Prerequisite: P-3 standing or consent of instructor.

PHA 532 ALTERNATIVE MEDICINE AND NUTRITION — **Three credits**

This course gives an overview of various alternative/contemporary medicine practices: homeopathy, herbal therapy, chiropractic, acupuncture, acupressure, body massage, ayurvedic, and shamanic practices. This course will also give an overview on the concept and practice of nutrition: parenteral and enteral nutrition. Lecture: Three hours.

Prerequisite: PHA 331, 332, 365 and P-3 standing or consent of instructor.

PHA 510. GENERAL MEDICINE CLERKSHIP — **Six credits**

Integration of basic pharmacy related concepts to the delivery of pharmaceutical care in general medicine practice. Clinical practice: Forty hours per week for a total of six weeks.

Prerequisite: P-4 standing.

PHA 511. AMBULATORY CARE CLERKSHIP — **Six credits**

Integration of basic pharmacy related concepts to the delivery of pharmaceutical care in ambulatory care settings. Clinical practice: Forty hours per week for a total of six weeks.

Prerequisite: P-4 standing.

PHA 512. COMMUNITY PRACTICE CLERKSHIP — **Six credits**

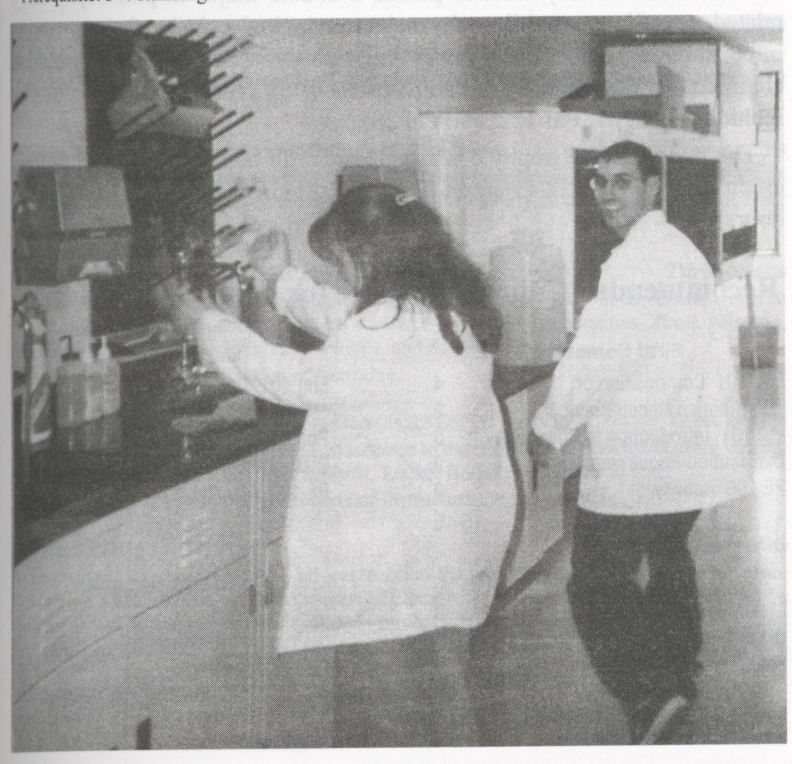
Integration of basic pharmacy related concepts to the delivery of pharmaceutical care in community practice settings. Clinical practice: Forty hours per week for a total of six weeks.

Prerequisite: P-4 standing.

PHA 513. RURAL PRACTICE CLERKSHIP — **Six credits**

Integration of basic pharmacy related concepts to the delivery of pharmaceutical care in rural practice settings. Clinical practice: Forty hours per week for a total of six weeks.

Prerequisite: P-4 standing.



PHILOSOPHY

Professor Fields, Chairperson; Associate Professor Paul; Professors Emeriti Kay, Williams.

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 or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	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
	15-16		15-16
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 Elective	3	Major Elective	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	8
	15		14

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.
Prerequiste: Phl 101 or permission of instructor.

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 216. PHILOSOPHIES OF NONVIOLENCE **Three credits**

An examination of the concept of nonviolence and arguments supporting nonviolence as a way of life. Historical and modern theories as well as applications of nonviolence will be considered including ideas from the Buddha, Jesus, Gandhi, Tolstoy, Martin Luther King, Jr., Thoreau, the Dalai Lama, Thich Nhat Hanh, and others. Students will be expected to consider the importance and relevance of these ideas for their own lives.

Prerequisite: Phl 101, 110 or permission of instructor.

PHL 217. THE QUESTION OF ANIMAL RIGHTS **Three credits**

An exploration of arguments supporting a wide variety of conclusions regarding our ethical obligations to nonhuman animals. We will examine standard moral theories, theories about the nature of current social practices, the history of our attitudes toward nonhuman animals, feminist arguments that our attitudes toward nonhuman animals are connected to negative views of female humans, and more.

Prerequisite: Phl 101, 110 or permission of instructor.

PHL 218. ENVIRONMENTAL ETHICS **Three credits**

An examination of the central problems of environmental ethics as viewed from the perspectives of science and of philosophy. The value of nature and "natural objects," differing attitudes toward wildlife and the land itself, implications of anthropocentrism, individualism, ecocentrism, and ecofeminism, bases for land and water conservation, and other topics will be examined within a framework of moral and scientific argument. (same as GES 218).

Prerequisite: Phl 101 **or** GES 240 **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. (Same as PS 263)

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 236. AMERICAN POLITICAL PHILOSOPHY **Three credits**

See description under Political Science Department listing. (Same as PS 262). May not be used to meet Area I of the General Education Requirements.

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 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 stuudied 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 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 50 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 Emeritus Reese; Associate Professor Emeritus Schmidt; Associate Professor Saracino.

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. It is recommended that at least one Physical Education experience be 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 274. DIMENSIONS IN HEALTH AND WELLNESS Three credits
This course provides a framework for the exploration of the concepts of holistic health, wellness, and alternative health care modalities through experiential exercises, reading, journaling and lectures. During the course the student will assess his/her personal health and wellness status, develop a plan to modify a specified health behavior, implement the plan using a variety of holistic modalities, and evaluate the outcome of the plan. This is a wellness elective appropriate for any student at any level. Lecture, discussion, class participation. No prerequisites. No corequisites. No fees. (same as NSG 274).

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 50 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 Orehotsky, Placek; Associate Professor Kucirka; Emeriti: Professor Donahoe, Hostler; Associate Professor Bailey.

Introductory Physics courses are provided in support of majors in Biology, Chemistry, Earth and Environmental Sciences, various Engineering programs and the large number of professional and preprofessional programs that the University provides in the health sciences, including Prepharmacy. Select upper-division Physics courses are offered from time to time as interest and need dictate. Students may find these courses helpful as electives in any of the programs offered by the University. Students who are planning to transfer to institutions which offer a major in Physics or any number of closely related disciplines will find these upper-division course offerings to be especially helpful. For information on courses, course availability, or using Physics coursework to strengthen your major or to enhance your transfer prospects, contact the Department of Engineering and Physics.

PHY 101. THE MECHANICAL UNIVERSE **Three credits**
This course traces the historical and philosophical development of the fundamental concepts of the physical sciences and how these discoveries have impacted on modern science. It begins with the great ancient Greek view of the cosmos and how these early ideas evolved into the mechanical view of the universe made famous by scientists like Kopernik, Galileo, Kepler and Newton. 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 102. PHYSICAL SCIENCE IN THE NUCLEAR AGE AND BEYOND **Three credits**
This course begins with the great discoveries of the nineteenth century dealing with electricity, magnetism, and optics, and how these ideas evolved into our understanding of the atom and the nucleus. It will consider the role of Einstein's theories in our understanding of the atom and how the discoveries of the late 19th and early 20th century have permanently changed our world. 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 101 is not a prerequisite for this course.

PHY 170. CONCEPTS IN PHYSICS AND CHEMISTRY **Four credits**
An overview of Classical Mechanics, Thermodynamics, and the elementary principles of modern physics, including selected topics in basic chemistry and applications to human health. Emphasis is placed on basic physical and chemical principles and on algebraic calculations, scaling, units conversions, Cartesian graphing, acid and base reactions, and numerical problem solving. Four hours of lecture/discussion, one three hour lab per week. Fee: $45.
Prerequisite: Previous courses in Chemistry, Algebra, Geometry..

PHY 171. PRINCIPLES OF CLASSICAL AND MODERN PHYSICS **Four credits**
An introductory course designed to promote an understanding of the more important fundamental laws and methods of mechanics and electricity and magnetism. 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 laboratory three hours a week. Fee:$45.

PHY 174. APPLICATION OF CLASSICAL AND MODERN PHYSICS **Four credits**
An introductory course designed to promote an understanding of the more important fundamental laws and methods of heat, optics and modern physics. 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 laboratory three hours a week. Physics 171 is not a prerequisite for this course. Fee:$45.

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 321)
Prerequisite: Phy 211/ME 231.
Corequisite: ME 322.

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 174 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 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 174 or 202.

PHY 331. ELECTRICITY & MAGNETISM I **Three credits**

Vector analysis. The concept of fields. Dielectric and magnetic media; fields in conductors; electric and 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 a dipole antenna. Three hours lecture a week.

Prerequisite: Phy 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 174 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 semi-conductors, 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 381.
Corequisite: Phy 332.

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 283, junior or senior standing in the sciences.

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 50 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; Assistant Professor Emeritus Tuhy; Assistant Professor Yoho.

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 — 39.

A major in Political Science requires 120 hours. These include 43 hours in the University's General Education requirements and 33 hours in political science. All majors must take the following courses that comprise the Core in political science: PS 111, 141, 161, 250, 261 and PS 380, a total of 18 credit hours. Students will then choose an additional 15 credits in political science of which at least 6 credits come from courses at the 300-level or higher. Students must also meet the quantitative applications requirement beyond PS 261 from a list of PS courses provided by the department.

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 Core in political science described above except for PS 380 (15 credits), and an additional 6 credits: three at the 200-level and three at the 300-level for a total of 21 credits.

Students may choose to concentrate in Public Administration by taking 36 credits. All public administration students must take: PS 111, PS 121, PS 141, PS 161, PS 222, PS 224, PS 225, PS 261, and PS 380. A practicum experience, PS 399, is also required for a minimum of 3 credits. An additional 6 credits in public administration electives at the 300-level are also required for a total of 36 credit hours in political science/public administration.

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.

Five Year Political Science/MBA Program

Students with interests in business or health care administration may pursue a five-year program of study leading to the Bachelor of Arts in political science with concentration in public administration and Master of Business Administration degrees OR the Bachelor of Arts in political science with concentration in public administration and Master of Health Administration degrees. Students can complete the political science major with a concentration in public administration program in four years and, with one additional full calendar year of classes, plus a summer, also complete the MBA degree.

Information on these programs and about career opportunities in these fields may be obtained from the chairperson of the Department of Political Science and Public administration, Room 327 D, Classroom/Office Building.

Recommended Course Sequence for a Major in Political Science

First Semester		Second Semester	
Eng 101 Composition or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
PS 111 Intro. to American Politics	3	PS 141 Intro. to International Politics	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15-16		15-16
Third Semester		**Fourth Semester**	
PS 161 Intro. to Political Thinking	3	Major Elective	3
Distribution Requirements	9	PS 261 Concepts and Methods or	3
PS 250 Intro to Comparative Politics	3	Soc 370 Methods	
	15	Free Electives	6
		Distribution Requirements	3
			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 380 Political Analysis	3	Free Electives	14
Major Elective	3		
Free Electives	9		
	15		14

Recommended Course Sequence for Concentration in Public Administration

First Semester		Second Semester	
Eng 101 Composition or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
PS 111 Intro. to American Politics	3	PS 141 Intro. to International Politics	3
PE 100 Activity	0	Distribution Requirements	9
Distribution Requirements	9	PE 100 Activity	0
	15-16		15-16
Third Semester		**Fourth Semester**	
PS 121 Intro. to Public Administration	3	PS 261 Concepts and Methods	3
Ec 101 Principles of Economics I *	3	Ec 102 Principles of Economics II *	3
Distribution Requirements	9	PS 224 Policy Analysis	3
PS 161 Political Thinking	3	Free Electives	6
	15-18		15
* Suggested			
Fifth Semester		**Sixth Semester**	
Public Administration Elective	3	Public Administration Electives	6
Acc 101 Intro. Financial Accounting *	3	PS 225 Planning and Evaluation	3
PS 222 Leadership	3	Free Elective	3
Free Electives	6	Ec 236 Public Finance *	3
	15		15
Seventh Semester		**Eighth Semester**	
PS 380 Political Analysis	3	PS 394 Practicum or	3
Free Electives	11	PS 399 Cooperative Education	3
		Free Electives	12
	14		15

* Suggested

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. Course includes a congressional simulation.

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.

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.

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 fall.

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 fall.

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. (Same as SOC 263)

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 activities of the American electorate in forms other than parties, such as interest groups, as well as grass roots movements.

PS 222. LEADERSHIP SKILLS AND ISSUES IN PUBLIC ADMINISTRATION **Three credits**
The topic of leadership effectiveness is of special interest because the problems in public organizations have become increasingly complex. Regardless of whether we examine government agencies, non-profit institutions or small enterprises, the pivotal factor needed to enhance human resources is leadership. The course focuses on three central issues: (a) What are the skills needed to be an effective leader in an era of reinventing government? (b) How does a leader encourage people to grow, take risks, innovate, and thrive? (c) How does a leader empower others, stay on course, or decide to change? (Same as PSY 250).

PS 224. PUBLIC POLICY ANALYSIS **Three credits**
This course is an introduction to the study of public policy at the national level. It will examine approaches to public policy and the operation of the "policy process." A range of public policy examples will be employed from social welfare to foreign and defense issues.

PS 225. STRATEGIC PLANNING AND EVALUATION IN PUBLIC ADMINISTRATION **Three credits**
This course approaches public administration from the perspective of planning and implementation of programs and policies. The course focuses on a full range of activities from defining and acquiring the necessary resources to establishing the time table for the completion of tasks. The final part of the course explores the differences between an outcome evaluation and a process evaluation designed to uncover the deficiences in an on-going program.

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.

PS 250. INTRODUCTION TO COMPARATIVE POLITICS **Three credits**
This course is an introduction to the study of politics and governments from a comparative perspective. It is not a survey course of the governmental institutions of particular countries, but rather an examination of types of governments and regimes the transitions that may occur between types of government, and approaches to studying, these topics. We will also examine the ways that ethnicity and cultural ideas affect governments and regime transition.
Prerequisite: Sophomore Standing.
Offered every fall semester.

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.

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.

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 every spring.

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.(Same as PHL 236) May not be used to meet Area I of the General Education Requirements.

PS 263. SURVEY OF POLITICAL PHILOSOPHY **Three credits**
See description under Philosophy Department listing. (Same as PHL 230).
Prerequisite: Phl 101 or permission of instructor.

PS 264. SURVEY RESEARCH METHODS **Three credits**
See description under Sociology Department listing. (Same as SOC 371).

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.

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.

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 121 or consent of instructor.

PS 322. LEGAL FOUNDATIONS IN PUBLIC ADMINISTRATION **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 121 or consent of instructor.

PS 331. THE CONSTITUTION AND THE FEDERAL SYSTEM **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.

PS 332. CIVIL RIGHTS AND LIBERTIES **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.

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 factors.

Prerequisite: PS 141 or consent of instructor.

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.

PS 380. CAPSTONE: POLITICAL ANALYSIS **Three credits**

In this course, students will engage in original research on topics of their own choice, supervised by members of the department. Students will identify a topic, devise a hypothesis (or research question), do a literature search, acquire the data/information to test the hypothesis, and prepare a research paper of publishable quality.

Prerequisite: Senior standing.
Offered every semester.

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. 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**

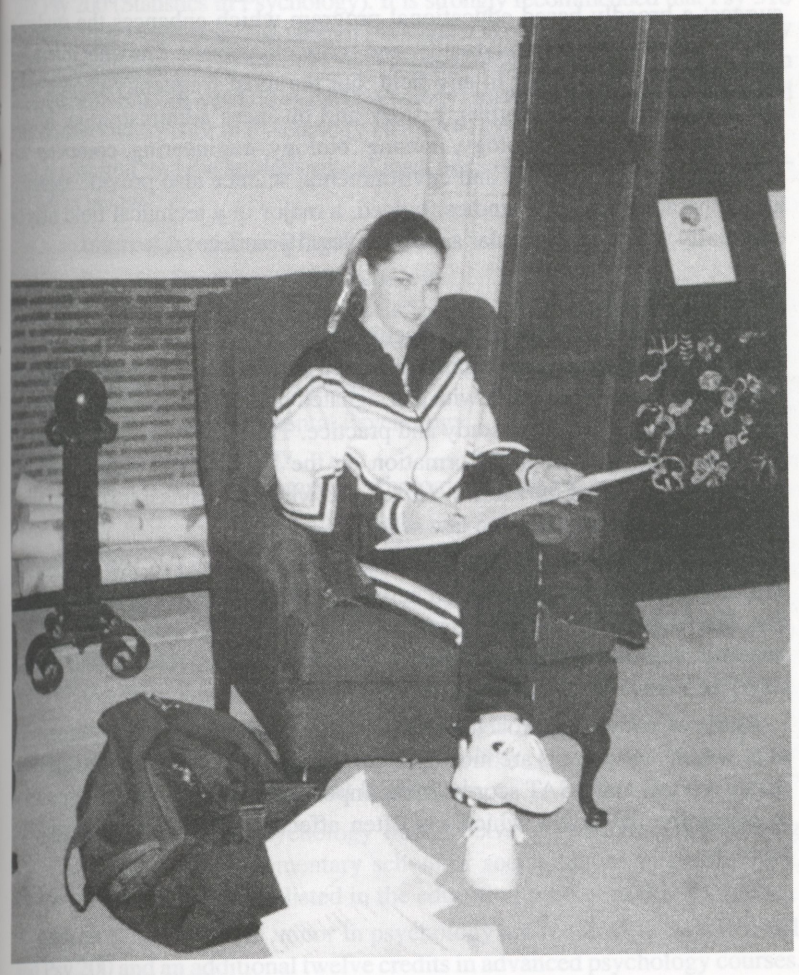
Professional cooperative education placement in a private/public organization related to the student's academic objectives and career goals. In addition to their work experience, students are required to submit weekly reaction papers and an academic project to a Faculty Coordinator in the student's discipline. (See page 50 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

Assistant Professor Yoho, 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. We strongly recommend that the LSAT be taken during June between the junior and senior year.

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.

PREPHARMACY

(see Pharmacy p. 271)

PSYCHOLOGY

Associate Professor Polachek, Chairperson; Professor Emeritus Riley; Associate Professor Emeritus Stetten; Assistant Professor Emeritus Kanner; Professors Bellucci, Bohlander, Charnetski; Assistant Professor Tindell.

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 (Statistics in Psychology). It is strongly recommended that Psy 310 (Experimental Psychology) be taken if the student is planning graduate study. Psy 310 is a prerequisite for Psy 395-396, Independent Research. 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 Behavioral Neuroscience
Psy 314 Sensory and Perceptual Processes

Interest Area II — Theoretical

Psy 221 Developmental Psychology
Psy 222 Personality
Psy 223 Contemporary Psychological Theories
Psy 226 History of Psychology
Psy 321 Comparative Psychology
Psy 326 Psychopathology
Psy 341 Social Psychology

Interest Area III — Applied

Psy 231 Psychological Tests and Measures
Psy 233 Industrial/Organizational Psychology
Psy 332 Clinical Methods in 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 or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15-16		15-16

Third Semester		Fourth Semester	
Major Elective or	3	Major Elective or	3
Psy 200 Statistics in Psychology*		Psy 200 Statistics in Psychology*	
Distribution Requirements	6	Distribution Requirements	9
Free Electives	6	Free Elective	3
	15		15

Fifth Semester		Sixth Semester	
Psy 310 Experimental Psychology†	3	Major Electives or	3
Major Elective or	3	Psy 200 Statistics in Psychology*	
Psy 200 Statistics in Psychology*		Major Electives	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	11
Free Electives	6		
	15		14

*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. STATISTICS IN PSYCHOLOGY **Three credits**
An introduction to the use of statistical procedures in the analysis of psychological data. Topics include descriptive statistics, parametric and non-parametric inferential statistical methods.
Prerequisite: Psy 101.

PSY 220. CONTEMPORARY PSYCHOLOGICAL ISSUES **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 the life span. 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. PERSONALITY **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 AND MEASURES **Three credits**
A survey of the psychometric properties of various instruments and measures of psychological phenomena (especially intelligence and personality). a variety of group and individual tests are studied as to their reliability, validity and utility.
Prerequisite: Psy 200.

PSY 233. INDUSTRIAL/ORGANIZATIONAL PSYCHOLOGY **Three credits**
A survey of the applied areas of personnel, organizational, human factors, and consumer psychology.
Prerequisite: Psy 101.

PSY 250. LEADERSHIP SKILLS AND ISSUES IN PUBLIC ADMINISTRATION **Three credits**
The topic of leadership effectiveness is of special interest because the problems in public organizations have become increasingly complex. Regardless of whether we examine government agencies, non-profit institutions or small enterprises, the pivotal factor needed to enhance human resources is leadership. The course focuses on three central issues: (a) What are the skills needed to be an effective leader in an era of reinventing government? (b) How does a leader encourage people to grow, take risks, innovate, and thrive? (c) How does a leader empower others, stay on course, or decide to change? (same as PS 222).

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. BEHAVIORAL NEUROSCIENCE **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. PSYCHOPATHOLOGY **Three credits**
A general survey of the principle forms of psychological disorders with an emphasis on etiology, nosology, symptoms, prognosis and general diagnostic issues.
Prerequisite: Psy 222.

PSY 330. NEUROPSYCHOLOGY **Three credits**
A survey of the relationship between nervous system physiology and human behavior. Topics of emphasis include: neurological disorders, neuropsychological assessment, head injury, cerebral asymmetry, rehabilitation.
Prerequisite: Psy 101 or approval of instructor.

PSY 332. CLINICAL METHODS IN PSYCHOLOGY **Three credits**
A survey of the clinical method in psychology with consideration of diagnostic issues. Therapeutic models as well as clinical techniques and issues are emphasized.
Prerequisite: 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: PSY 310; Approval of department chairperson is required.

PSY 397. SEMINAR (Maximum of three credits per student) One to three credits
Presentation 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 50 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

Professor Baldino, Chairperson; Professor Merryman; Associate Professors Garr, Natzke, 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 slightly more than one calendar year after completion of their B.A. degree.

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 250 may be taken for credit toward the major. Sociological Analysis 372 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), 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 51).

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. See the Pre-Law section in this Bulletin for further details.

Criminal Justice

Wilkes University offers its students an opportunity to pursue the equivalent of a second major or minor in criminal justice at King's College. The major sequence in Criminal Justice at King's College requires 14 courses (42 credits). Eight of these 14 courses are offered on a regular basis at Wilkes. The minor sequence requires 6 courses (18 credits), one of which is offered at Wilkes. Criminal Justice majors may elect to participate in one or more on-the-job internships at one of many law enforcement agencies. Those interested in the criminal justice program should consult with the Chair of the Department of Sociology, Anthropology and International Studies.

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 calendar year of schooling, plus a summer, 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 or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15-16		15-16
Third Semester		**Fourth Semester**	
Distribution Requirements	9	Distribution Requirements	3
Major Elective	3	Major Elective	3
Free Electives	3	Free Electives	9
	15		15
Fifth Semester		**Sixth Semester**	
Soc 341 Social Psychology	3	Soc 371 Methods of Research	3
Major Elective	3	Major Electives	6
Free Electives	9	Free Electives	6
	15		15
Seventh Semester		**Eighth Semester**	
Soc 381 Sociological Theory	3	Free Electives	14
Free Electives	12		
	15		14

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
Eng 101 Composition or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
Distribution Requirements	9	Distribution Requirements	9
PE 100 Activity	0	PE 100 Activity	0
	15-16		15-16
Third Semester		**Fourth Semester**	
Sociology Elective	3	Sociology Elective	3
Ec 101 Economics I*	3	Ec 102 Economics II*	3
Acc 101 Financial Accounting*	3	Acc 102 Managerial Accounting*	3
Distribution Requirements	6	Distribution Requirements	6
	15		15

Fifth Semester

Soc 341 Social Psychology	3
BA 351 Management of Organizations*	3
Free Electives	9
	15

Sixth Semester

Sociology Elective	3
BA/Ec 319 Business/Ec Statistics*	3
Free Electives	9
	15

Seventh Semester

Soc 381 Sociological Theory	3
Sociology Elective	3
Free Electives	9
	15

Eighth Semester

Soc 371 Methods of Research	3
Soc 395 Independent Research	1
Sociology Elective	3
Free Electives	7
	14

* Students must earn 2.0 or better in MBA track.

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 cries 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 underlie 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 263. THE URBAN INVIRONMENT **Three credits**
See description under Political Science listing, PS 212. (Same as PS 212).

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 50 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

Adjunct Professor Harrington, Chairperson; Professor Emeritus, Groh; Associate Professor Dawson; Artist in Residence, Hill; Adjunct Professors Kurtz, Neubert.

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 57 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		Second Semester	
Eng 101 Composition or	4	Eng 101 Composition or	4
Distribution Requirement	3	Distribution Requirement	3
THE 121 Stagecraft	3	THE 132 Speech for the Stage	3
THE 131 Acting I	3	Distribution Requirements	6
THE 190 Theatre Laboratory	1	THE 190 Theatre Laboratory	1
Distribution Requirements	6	The 191 Practicum	1
PE 100 Activity		PE 100 Activity	
(Dance Course Recommended)	0	(Dance Course Recommended)	0
	16-17	Eng 112, 115 or 120	3
			17-18

Third Semester		Fourth Semester	
THE 111 Play Structure and Criticism	3	THE 112 Script Analysis	3
THE 211 Theatre History I	3	THE 141 Oral Interpretation	3
THE 221 Scene Design	3	THE 212 Theatre History II	3
THE 232 Acting II	3	THE 190 Theatre Laboratory	1
Distribution Requirement	3	THE 191 Practicum	1
THE 190 Theatre Laboratory	1	Elective in Dramatic Literature	3
	16	Elective	3
			17

Fifth Semester		Sixth Semester	
THE 331 Acting III	3	THE 234 Directing I	3
THE 394 The Business of Acting	1	THE 394 The Business of Acting	1
Free Elective	3	Distribution Requirements	6
Distribution Requirements	6	Dramatic Literature Requirement	3
THE 190 Theatre Laboratory	1	THE 190 Theatre Laboratory	1
	14	THE 191 Practicum	1
			15

Seventh Semester		Eighth Semester	
THE 431 Acting IV	3	THE 335 Directing II	3
THE 394 The Business of Acting	1	THE 393 Senior Seminar	1
Distribution Requirement	3	THE 394 The Business of Acting	1
Free Electives	8	THE 191 Practicum	1
THE 190 Theatre Laboratory	1	Free Electives	6
	16	THE 190 Theatre Laboratory	1
			13

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 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 and professional 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 101.

THE 112. SCRIPT ANALYSIS — **Three credits**
The cultivation of interpretive skills as an approach to dramatic literature for the purposes of production. Classical Literature.
Prerequisite: THE 111.

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 141. ORAL INTERPRETATION **Three credits**
Instruction in vocal delivery of prose, poetry, drama, and archaic language for the purposes of oral communication of the written text.
Prerequisite: THE 131 or permission of instructor.

THE 190. THEATRE LABORATORY **One credit**
A study, through the application of various techniques of different facets of theatre 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.

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 department, 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 121.

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 131 or departmental permission.

THE 331. ACTING III **Three credits**
Attention to special problems in acting in terms of classical style. Continued self-discovery through improvisation, kinesthetic awareness, and other basic acting techniques learned in THE 232 are expanded upon.
Prerequisites: THE 131, 132, 231, 232 or permission of instructor.

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 393. SENIOR SEMINAR **One credit**
Discussion, research, and exploration of a selected topic in conjunction with a departmental theatre production. Presentations and a research project.

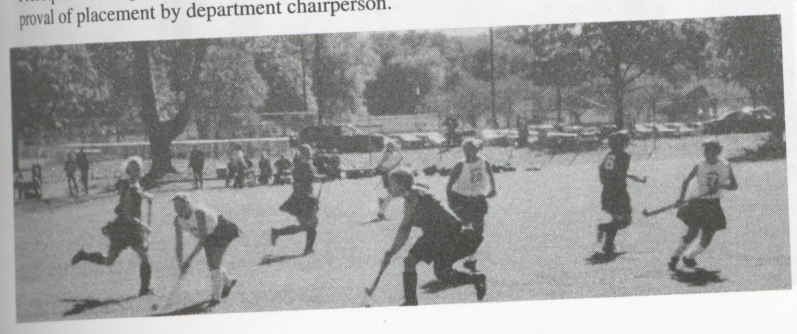
THE 394. THE BUSINESS OF ACTING **One credit**
Discussion of materials, credentials, audition preparation needed to secure career opportunities in the entertainment industry. Student work will be videotaped and sent to casting agents. Taken by Theatre Performance majors each semester in their Junior and Senior years.

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 431. ACTING IV **Three credits**
Scene study, analysis, and development of acting theories for a sophisticated preparation of audition material and rehearsal technique for the working actor.
Prerequisites: THE 131, 132, 231, 232, 331, 332 or permission of instructor.

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 50 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 Garr, P. Heaman, Kalter, McKinley.

Total minimum number of credits required for a minor — 18.

Women's Studies in 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 may also earn Women's Studies credit for approved internships they take in participating departments.

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 and the development of the Capstone Project.

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 assumption 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 theatre are explored as a general education experience in Distribution of Studies Area IV, Artistic Expression.





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University Relations Office ..... Q
Recorder ..... O
Registrar ..... O
Residence Life Office L
Student Affairs Office ..... F
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Study Abroad Coordinator ..... E
Summer Program Office ..... F
Testing Center I
Theater ..... G
Upward Bound Office ..... P
Weekend Program Office ..... F
Wilkes University Learning Center ..... F
Writing Laboratory ..... E

Building Key

Symbol	Building and Location
A	Annette Evans Faculty and Alumni House, 146 South River Street
B	Capin Hall, 165 South Franklin Street
C	Chase Hall, 184 South River Street
D	Church Hall, 187 South Franklin Street
E	Classroom/Office Building (COB), 137-139 South Franklin Street
F	Conyngham Hall, 130 South River Street
G	Dorothy Dickson Darte Center for the Performing Arts, Corner of River and South Streets
H	Eugene Shedden Farley Library, Corner of Franklin and South Streets
I	Evans Hall, Corner of South River and Northampton Streets
J	Marts Center, 272-274 South Franklin Street
K	Max Roth Center, 215 South Franklin Street
L	Pickering Hall, Wright Street
M	Slocum Hall, 262-264 South River Street
N	Stark Learning Center, 160 South River Street
O	Passan Hall, 267 South Franklin Street
P	Sturdevant Hall, 129 South Franklin Street
Q	Weckesser Hall, 170 South Franklin Street

1999-00 WEEKEND COLLEGE CALENDAR

(Courses taught on the campus of Keystone College. La Plume. Pennsylvania)

Summer Session
May-August, 1999

April 30, May 1,2*
May 14, 15, 16
June 11, 12, 13*
June 25, 26, 27
July 16, 17, 18
August 6, 7, 8
(Including Final Examinations)

Fall Session
September-December, 1999

September 10, 11, 12*
September 24, 25, 26
October 15, 16, 17
November 5, 6, 7*
November 19, 20, 21
December 10, 11, 12
(Including Final Examinations)

Spring Session
January-April, 2000
(Courses taught on the campus of Wilke University, Wilkes-Barre, Pennsylvania)
To be announced

* Two-week interval between class meetings

WILKES UNIVERSITY
1999–2000 ACADEMIC CALENDAR

SUMMER 1999 – PRE-SESSION		
Classes Commence	Monday, May 17, 1999	8:00 a.m.
Classes End	Friday, June 4, 1999	12:00 noon
	(INCLUDING FINAL EXAMINATIONS)	
FIRST DAY SESSION		
Classes Commence	Monday, June 7, 1999	8:00 a.m.
Classes End	Friday, July 9, 1999	12:00 noon
	(INCLUDING FINAL EXAMINATIONS)	
NINE-WEEK EVENING SESSION		
Classes Commence	Monday, June 7, 1999	6:00 p.m.
Classes End	Tuesday, August 10, 1999	10:00 p.m.
	(INCLUDING FINAL EXAMINATIONS)	
SECOND DAY SESSION		
Classes Commence	Monday, July 12, 1999	8:00 a.m.
Classes End	Friday, August 13, 1999	12:00 noon
	(INCLUDING FINAL EXAMINATIONS)	
FALL SEMESTER – 1999		
Classes Commence	Monday, August 30, 1999	8:00 a.m.
Labor Day Recess	Friday, September 3, 1999	5:00 p.m.
Classes Resume	Tuesday, September 7, 1999	8:00 a.m.
Fall Recess	Friday, October 8, 1999	5:00 p.m.
Classes Resume	Tuesday, October 12, 1999	8:00 a.m.
Thanksgiving Recess	Tuesday, November 23, 1999	10:00 p.m.
Special Note	Tuesday, November 23, 1999	
	(FOLLOW MONDAY CLASS SCHEDULE)	
Classes Resume	Monday, November 29, 1999	8:00 a.m.
Classes End	Friday, December 10, 1999	5:00 p.m.
Final Examinations Begin	Monday, December 13, 1999	8:00 a.m.
Final Examinations End	Tuesday, December 21, 1999	4:30 p.m.
INTERSESSION – 2000	Monday, January 3, 2000 to Friday, January 14, 2000	
SPRING SEMESTER – 2000		
Classes Commence	Monday, January 17, 2000	8:00 a.m.
WINTER COMMENCEMENT	Thursday, January 20, 2000	11:15 a.m.
Spring Recess	Friday, March 3, 2000	5:00 p.m.
Classes Resume	Monday, March 13, 2000	8:00 a.m.
Easter Recess	Wednesday, April 19, 2000	10:00 p.m.
Classes Resume	Tuesday, April 25, 2000	8:00 a.m.
Special Note	Tuesday, May 2, 2000	
	(FOLLOW THURSDAY CLASS SCHEDULE)	
Classes End	Wednesday, May 3, 2000	5:00 p.m.
	(FOLLOW FRIDAY CLASS SCHEDULE)	
Final Examinations Begin	Friday, May 5, 2000	8:00 a.m.
Final Examinations End	Saturday, May 13, 2000	4:30 p.m.
COMMENCEMENT	Saturday, May 20, 2000	11:00 a.m.

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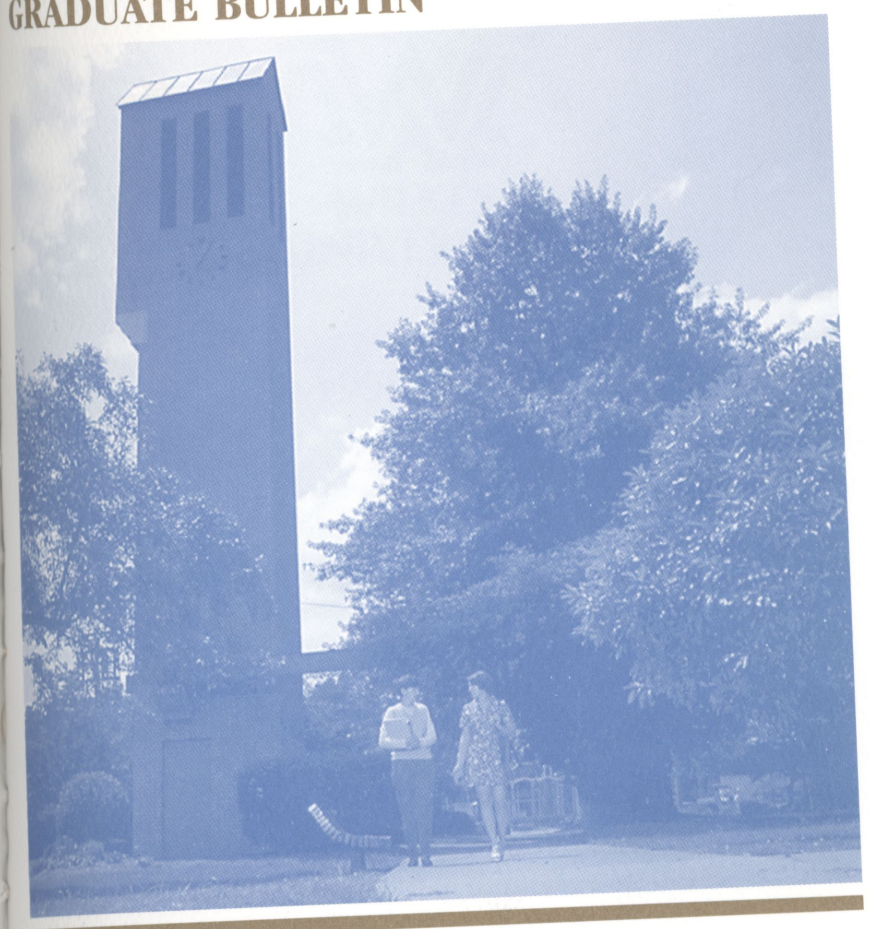
Wilkes University
GRADUATE BULLETIN



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1999-2000

Graduate Bulletin

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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 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 Office (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, religion or national origin.

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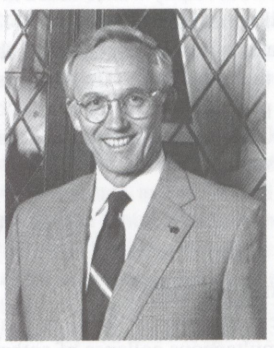
The President's Message



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 newest graduate degrees in Pharmacy and Education were approved by the Board of Trustees. Wilkes University is committed to offering 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. The University has continued to expand its graduate and undergraduate programs, most recently adding a School of Pharmacy in 1993. There are more than 1,500 full-time undergraduate students, 500 part-time undergraduate students and 700 graduate students.

The Wilkes Tradition

Community Service

Wilkes came into existence as a junior college in the midst of the economic crisis caused by the simultaneous collapse of anthracite coal mining and the onset of the Great Depression. Wilkes's 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. Wilkes developed into a comprehensive institution, offering a broad range of bachelor's and master's degree programs, continuing the 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's mission has been shaped in fundamental ways by the unique perspective on education of Eugene Shedden Farley, 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's 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's overarching imperative is 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, including Pharmacy. 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's 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.

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's tradition of service, excellence, and diversity.

General Information 1999-2000

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.

The University 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 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 Office of Graduate Studies. Extra-curricular and other support services for graduate students also are provided by the Office of Graduate Studies.

Accreditation

Wilkes's 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.

Admissions

Application

Those interested in graduate programs offered at Wilkes should apply to the Graduate Office in the Passan 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 programs also require letters of recommendation and some require test scores for admission. For example, 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 may 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.

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 officially acted upon by the Office of Graduate Studies.

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 Office 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 the Graduate Office for an extension.

Graduate Degree Programs

Degrees	Programs
Master of Business Administration, M. B. A.	Business Administration (p. 21) Concentrations: Accounting, Finance, Health Care, Human Resource Management, International Business, Marketing
Master of Science, M. S.	Mathematics (p. 51) Nursing (p. 58)
Master of Science in Education, M. S. Ed.	Classroom Technology (p. 23) Educational Development & Strategies (p. 23) Instructional Technology (p. 23) Educational Leadership (p. 23) Secondary Education with concentration in: Biology (p. 36) Chemistry (p. 39) English (p. 40) History (p. 42) Mathematics (p. 51) Physics (p. 45)
Master of Science in Electrical Engineering, M.S.E.E.	Electrical Engineering (p. 45)

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 Chairperson of the Department offering the course, and the Office of Graduate Studies. Credit for such courses will be at the undergraduate level.

Special Non-Degree

Students are allowed to apply for admission and 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 Chairperson of the Department in which the student seeks to take additional courses as a special non-degree student.

Professional Development for Teachers

Teachers wishing to take graduate courses for professional development 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. While there is no limit on the number of graduate courses that teachers may take for professional development, some of these courses may not fulfill a requirement for a master's degree at Wilkes. Teachers should consult the Wilkes Graduate Bulletin for degree requirements as well as confer with the Chair of the Education Department in order to determine which courses are required for a specific M.S. in Education degree program at Wilkes.

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 in these courses.

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 approvals 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 student 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 Department Chairperson 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.

Course Numbering

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

400-499 Courses for graduate students and advanced undergraduates

500-599 Courses for graduate students only (except with special permission)

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 Office of Graduate Studies. The Graduate Dean will review the request and consult with appropriate parties (graduate program director, chairperson, advisor or academic dean). and 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. 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 of the programs described below.

Specific requirements for graduate degrees will be found within each of the degree programs described below.

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 Office 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 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 graduation requirements
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 of the semester in which the "X" grade was recorded. 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.**

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 Office of Graduate Studies. A mark 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 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 others 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 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 recommendations.

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 Chairperson of the Department 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 departmentoffice 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 Chairperson, and the Office of Graduate Studies.

6. Student appeals to any provisions in this policy shall be to the Thesis Advisor, the Department, and finally to the Graduate Studies Committee.

The original and two copies of the thesis must be submitted to the Office 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 Graduate Studies 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

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 $50 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 $6 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, Passan Hall.

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, M.B.A., M.S., M.S.E.E.: $542 per credit hour.
Tuition Cost, M.S.Ed.: $210 per credit hour.
General Fee: $9 per credit hour.
Technology Fee: $3 per credit hour.
Graduation Fee: $135 (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 $6 per copy.
Audit Fee: One half of tuition cost.
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.

	Time of withdrawal	Tuition Refund
Academic Year	First two weeks	90%
	Third and Fourth weeks	50%
	Fifth-eighth weeks	25%
	After eighth week	No refund
5-week Summer Sessions	First week	50%
8-week Summer Sessions	First two weeks	50%
	Third-eighth weeks	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, Passan Hall, 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.

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 postsecondary 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. 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 or have the interest capitalized. 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 or have the interest capitalized. 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. The maximum additional amount is $10,000 for academic grade level with an aggregate limit of $73,000.

This loan carries the same interest rate and repayment obligation as described under the section on Stafford Loans.

Graduation

All graduating graduate students are expected to participate in one of the three commencement exercises held over the calendar year. These exercises occur in August or September, 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.

Academic Programs

Accounting

See Business Administration, page 16.

Biology

See Biology/Secondary Education, M. S. in Education, page **36**.

Business Administration

Jeffrey R. Alves, Ph.D., Chairperson
C. Russel Havey, M.B.A., Program Director

Master of Business Administration (MBA)

Purpose

The curriculum leading to the Master of Business Administration degree at Wilkes emphasizes a general, broad-based approach to graduate business education. Students acquire the quantitative and judgmental skills necessary for a manager to succeed. The program provides advanced training in the functional areas of business and also provides the opportunity for specialization in a selected field through additional training in Accounting, Finance, Health Care, Human Resource Management, International Business, and Marketing. The core objectives of the MBA include:

- To develop professional managers, with emphasis on the 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 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 provides management education at the master's level for students with varied undergraduate backgrounds: business and economics, engineering and science, and others.

Master of Business Administration courses are offered on weekday evenings and in a year-round weekend format. Weekend courses are offered on Saturday and Sunday every third or fourth weekend, five weeks per trimester.

The Department is a member of The International Association for Management Education and the Association of Collegiate Business Schools and Programs. The MBA program is accredited by the Association of Collegiate Business Schools and Programs.

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. Submit to the Graduate Admissions Office a completed graduate application for admission with payment of appropriate application fee;
2. 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;
3. Demonstrate satisfactory performance as an undergraduate by providing a complete set of official undergraduate transcripts to the Graduate Admissions Office;
4. Demonstrate satisfactory performance on the Graduate Management Admission Test (GMAT). Test results should accompany the application.

To be accepted on an unconditional or **regular** basis, a candidate for the Wilkes MBA must obtain an admission score of at least 975 [computed as (undergraduate GPA x 200) + (GMAT score)]. A prospective MBA student achieving an admission score less than 975 may be accepted into the MBA program on a **conditional** basis. To change to regular status, the conditionally accepted MBA student must maintain no less than a 3.0 GPA in the first six graduate credits (course level 500 or higher) of the MBA program. Failure to maintain the minimum 3.0 GPA will result in dismissal of the conditionally accepted student from the MBA program.

The Master of Business Administration (MBA) Program at Wilkes practices intensive self-directed student advising. A student accepted into the program 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 focus of the advising process is to encourage students to develop a responsible and rewarding career.

Degree Requirements

A minimum of thirty-six (36) credit hours are required for all MBA students. These consist of twenty-seven (27) credits in CORE courses and nine (9) credits in ELECTIVE courses. Those students who have not completed undergraduate courses in financial accounting, managerial accounting, macroeconomics, microeconomics, statistics, and management will need to complete up to twelve (12) credits of FOUNDATION courses. Students will consult with their advisors concerning their personal interests to select nine (9) hours of elective courses from those described on pages 20 to 22 in this catalogue.

Students do not need to concentrate their electives in one area of study, but those wishing to complete an area of concentration within the MBA must take all nine (9) credits of electives in that particular concentration.

Courses of Instruction

Foundation Courses (0-12 credits)

MBA 500. FOUNDATIONS OF ACCOUNTING **Three credits**
A study of the essential foundations of both financial and managerial accounting. The course includes accounting and analysis techniques used in decision-making activities such as financial statement analysis and budgeting. (Intended for MBA students not having taken

accounting courses, or those interested in reviewing their accounting background.)
Note: Students will be exempted from this course if they have achieved a grade of C or better in undergraduate financial accounting and a grade of C or better in undergraduate managerial accounting.

MBA 510. FOUNDATIONS OF QUANTITATIVE BUSINESS ANALYSIS **Three credits**

This introductory course consists of three distinct, yet overlapping modules: management information systems (MIS), operations management (OM), and applied business statistics. Topics will provide the graduate business student with foundational material developed throughout the MBA program. Desired outcomes include knowledge of theoretical principles and how to apply them in dynamic business environments. MIS topics include strategic, organizational, and ethical issues; database management; design, knowledge management; and decision support. Case analysis will be the principal assessment tool for this module. OM topics include decision-making processes, facility location and layout, material requirements planning, distribution, scheduling, and assignment. Students will solve non-probabilistic problems using spreadsheet software, and observe demonstration of application software. Statistics topics will be selected from data analysis, descriptive statistics, probability distributions, sampling, inferential statistics, hypothesis testing, correlation analysis, regression analysis (simple linear, multiple), and analysis of variance. In this segment, spreadsheet and statistical software will be utilized.
Note: Students will be exempted from this course if they have achieved a grade of C or better in undergraduate statistics.

MBA 530. FOUNDATIONS OF ECONOMICS **Three credits**

A study of the essential foundations of both micro and macroeconomics. The course will introduce the problem of scarcity, the concept of opportunity cost, and supply and demand analysis to the student. Additionally, the course will focus on a variety of topics including national income accounting, unemployment, inflation, monetary and fiscal policy, long-term growth, consumer behavior, the theory of the firm, and the efficiency of resource allocation under various market structures.
Note. Students will be exemptedirom this course if they have achieved a grade of C or better in undergraduate macroeconomics and a grade of C or better in undergraduate microeconomics.

MBA 550. FOUNDATIONS OF MANAGEMENT **Three credits**

An overview of management theory and practice that integrates the management functions with organizational behavior and human resource management. Global and ethical implications will be in the discussions.
Note: Students will be exempted from this course if they have achieved a grade of C or better in undergraduate principles of management.

The Core (27 credits)

All core courses must be taken in the traditional fashion. They may not be taken on an independent study basis.

MBA 512. DECISION SCIENCES I **Three credits**

In this course, students will develop a working knowledge of management science models so they can apply them in modern business environments. Desired outcomes include the ability to translate business problems into the appropriate mathematical formulation, apply the appropriate quantitative model, and interpret the results using sensitivity analysis to respond to "what if" managerial challenges. All models covered in this class will be solved

using spreadsheet software; application software will also be demonstrated for certain models. Course topics include multiple-criteria decisionmaking, inventory management, project management and forecasting models. Case analysis, textbook exercises, and an applied project will be the principal outcome assessment tools.
Prerequisite: MBA 510

MBA 513. DECISION SCIENCES II **Three credits**

In this course, students will develop a working knowledge of advanced management science models so they can apply them in modern business environments. Desired outcomes include the ability to translate business problems into the appropriate mathematical formulation, apply the appropriate quantitative model, and interpret the results, using sensitivity analysis to respond to "what if" managerial challenges. All models covered in this class will be solved using spreadsheet software; application software will be used for linear programming applications. Course topics include mathematical programming, Markov analysis, waiting line models and simulation. Case analyses, textbook exercises, and an applied project will be the principal outcome assessment tools.
Prerequisite: MBA 512

MBA 520. MARKETING MANAGEMENT **Three credits**

This course presents a strategic foundation for marketing decision-making. It integrates the tactics of information gathering, environment analysis, competitive analysis, product positioning and the implementation of strategic positioning. Emphasis is placed on written and verbal communications skill development.
Prerequisite: MBA 530

MBA 532. MANAGERIAL ECONOMICS **Three credits**

Problems of the firm and how to solve them. Price and output determination with analysis of cost and demand functions in markets of various types as well as decision making under conditions of uncertainty and over time. Emphasis is given to firm's role in the global economy and the theory of international trade. The course will deal with the application of economic theory to business practice.
Prerequisite: MBA 530

MBA 540. FINANCIAL MANAGEMENT **Three credits**

A survey of the tools and techniques currently employed by financial decision makers when evaluating organizational performance and developing future courses of action. Emphasis will be placed upon working capital management and capital budgeting techniques.
Prerequisite: MBA 500

MBA 552. ORGANIZATIONAL BEHAVIOR AND LEADERSHIP **Three credits**

The purpose of this course is to examine leadership and organizational issues in the private and nonprofit sectors. We will specifically focus on the similarities and contrasts of leadership issues in the health care and business sectors. This course emphasizes how to become an effective leader by achieving mastery over the noisy, incessant and changing environment rather than simply reacting and living in a perpetual state of shock. The course focus is on three central issues: a) what makes a person an effective leader, b) how does a leader encourage high performance and build commitment, and c) how does a leader translate intention into reality, communicate those intentions successfully. empower others, and stay on course while knowing when to change.
Prerequisite: MBA 550

MBA 560. FINANCIAL AND MANAGERIAL ACCOUNTING **Three credits**

A basis 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 users. Students with 12 credit hours or more of accounting must fulfill the accounting core requirement by taking one ofthe following: MBA 561, MBA 563 or MBA 564. (No independent research.)

Prerequisite: MBA 500

MBA 580. BUSINESS ISSUES IN A DYNAMIC ENVIRONMENT **Three credits**

This course introduces students to the varied diverse stakeholders who impact directly and indirectly on business policy and public policy formation. Included is analysis of the ways in which the interests of the customer, the creditor, the shareholder, the employee, the government, and the society interface with optimal decision-making by business organizations. The course utilized current business issues to provide students with the opportunity to think and write critically and entrepreneurially, while being sensitive to ethical, global, and policy dimensions.

MBA 590. STRATEGIC MANAGEMENT & 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 the core courses as well as enhance the written and oral communication skills of students.

Prerequisite: Minimum of 24 MBA-level complete credits with all core MBA courses complete **or** currently being taken.

Elective Courses (9 credits)

MBA 521. THE GLOBAL MARKET ECONOMY **Three credits**

This course is designed to introduce the student to the practical principles and methods of global marketing. Subjects covered will include the development and management of exports and imports, channels of trade, the mechanics of global finance, foreign credits, and strategic alliances.

Prerequisites: MBA 520 and MBA 580

MBA 522. PRICE POLICY AND PROCEDURE **Three credits**

This course describes the basic pricing process, relates it to pricing decisions, and attempts to position pricing for both consumer and industrial markets. Topics covered will include internal and external factors in pricing decisions, pricing models in various kinds of market structures, the special problems of manufactures and distributors, and effective pricing strategies and tactics for both new and existing products and services.

Prerequisite: MBA 520

MBA 523. 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: MBA 520

MBA 524. MARKET RESEARCH **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.

Prerequisites: MBA 510 and MBA 520

MBA 541. 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: MBA 540

MBA 542. FINANCIAL MANAGEMENT **Three credits**

An investigation into the theories and techniques of financial planning 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: MBA 540

MBA 543. FINANCIAL MARKETS AND 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.

Prerequisite: MBA 540

MBA 544. RISK MANAGEMENT AND INSURANCE **Three credits**

A study of the principles of risk management and insurance applies 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.

Prerequisite MBA 540

MBA 551. 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.

Prerequisite: MBA 550

MBA 553. EMPLOYMENT LAW AND COMPENSATION **Three credits**

This 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. Design, management and administration of compensation systems are covered along with recent developments in benefit packages.

Prerequisite: MBA 550

MBA 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: MBA 560 or 12 credit hours of accounting.

MBA 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: MBA 560 or 12 credit hours of accounting.

MBA 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: MBA 560 or 12 credit hours of accounting.

MBA 564. ADVANCED MANAGEMENT ACCOUNTING **Three credits**
An advanced course in current management accounting topics such as Total Quality Management, JIT Philosophy, and Activity-Based Costing. Emphasis will be on the use of management accounting information as well as the quantitative factors. The formation of management control systems and the behavioral implications of those system will also be emphasized.

Prerequisite: MBA 560 or 12 credit hours of accounting.

MBA 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.

Prerequisite: MBA 580

MBA 573. INTERNATIONAL BUSINESS MANAGEMENT **Three credits**
This is an integrative 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.

Prerequisite: MBA 580

MBA 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.

Prerequisite: MBA 580

Special Courses

MBA 595-596. INDEPENDENT RESEARCH **Three credits each**
Independent study and research for advanced students in the field of the major under the direct of a staff member.

MBA598. TOPICS **Three credits**
Special topics in a major field. This course will be offered from time to time as interest and demand justify it.

HSA 500. 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, 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.

HSA 502. 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, and costbenefit analysis are examined, and possible solutions to these problems are offered.

Prerequisite: EC 500

HSA 504. FINANCIAL MANAGEMENT IN HEALTH CARE ORGANIZATIONS **Three credits**
Provides and understanding of the primary facts of health care financial management. Includes such topics as institutional fiscal policies, accounting concepts and practices, reimbursement theory, financial statistical reporting, costs containment, and the use of financial data as management tools.

Prerequisite: MBA 500

HSA 506. 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.

Computer Science

See Mathematics, page 51.

Earth and Environmental Sciences

Sid Halsor, 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.

Education

Joseph T. Bellucci, Ed.D.,
Director, Graduate Programs in Education

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 Classroom Technology, Educational Development and Strategies, Educational Leadership, and Instructional Technology); Secondary Education/Biology; Secondary Education/Chemistry; Secondary Education/English; Secondary Education/History; Secondary Education/Mathematics; and Secondary Education/Physics.

Wilkes University provides two graduate programs with certification. The Master of Science Degree in Educational Leadership provides elementary and/or secondary principal certification. The Master of Science Degree in Instructional Technology provides Pennsylvania Instructional Technology Specialist certification.

Wilkes University houses a K-12 Regional Computer Resource Center (RCRC) which provides microcomputer laboratories, as well as an extensive educational software library, used primarily by students in the M.S. in Instructional Technology and Classroom Technology degree programs.

The RCRC also provides microcomputer facilities and technical support to all teachers enrolled in graduate study at Wilkes. Additional services include:

1. Training for K-12 teachers in microcomputer topics via short workshops and seminars; and
2. Assistance to school districts in designing computer-oriented curricula.

Special Features of the Program

Graduate programs in Education are 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. Off-campus programs are available for Classroom Technology, Educational Development and Strategies and Educational Leadership programs.

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 Graduate Education Department, be granted provisional admission. Deficiencies must be made up satisfactorily before full admission to graduate study will be granted.

Students are allowed to apply for admssion and to register as special non-degree graduate students. They must complete the Application for Admission form, check status desired (special non-degree) and pay the required application fee. The University's general rule for non-degree students limits the number of credits to six. However, a teacher may take courses for professional development to keep abreast with the latest trends in education, as a non-degree student, and there is no limit to the number of Education courses that a student may take. Nevertheless, teachers wishing to pursue one of the M.S. in Education degree programs offered at Wilkes must complete the sequence of courses required for the degree as listed in the Wilkes Graduate Bulletin.

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 late afternoon and evening. Students may transfer a maximum of six graduate credits from an approved college or university. Transfer credits should be no more than six years old with a grade of B or better and must be approved by the Director of Graduate Programs in Education. For additional information see Transfer Credits in the General Information section at the beginning of this Graduate Bulletin.

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. A student who opts for a second degree must submit a written request to the Director of Graduate Programs in Education.

Degree Requirements

All candidates for the Master of Science in Education degree must complete a program of at least thirty credits including six credits in Area I and three credits in Area II in addition to ED 522 - School Curriculum. Instructional Technology majors do not take ED 522 but take ED 589. See individual program descriptions below for specific program course requirements.

Master's Degree Programs

Classroom Technology

Kathy Moran
Assistant Director of Graduate Education Admissions

A candidate for the Master of Science in Education degree with an emphasis in Classroom Technology must complete 30 credits with a minimum of six credits in Area I; three credits in Area II plus ED 522-School Curriculum; the following courses from Area VI: ED 526, ED 527, ED 528, ED 585 and six elective credits. Completion of the Classroom Technology degree does not fufill the requirements for any additional teacher certification area. The intent of this program is to upgrade the technology skills of the classroom teacher.

Along with the program at Wilkes University, the M.S. in Education with a concentration in Classroom Technology is offered at the following off-campus sites: Bethlehem School District, Berks County IU 14, Carbon-Lehigh IU 21, Carbondale School District, Delaware Valley School District, Jim Thorpe School District, Luzerne IU 18, Mount Carmel School District, MMI-Freeland, Northeastern IU 19, Pleasant Valley School District, Schuylkill IU 29, St. Jude's-Mountaintop, Tunkhannock School District, Valley View School District, Wallenpaupack School District and Wilkes-Barre School District.

Educational Development and Strategies

Kathy Moran
Assistant Director of Graduate Education Admissions

A candidate for the Master of Science in Education may elect the program in Educational Development and Strategies. The requirements for this 30-credit degree are: a minimum of two courses in Area I; two courses in Area II (one of which must be ED 522), four courses in Area V (additional courses in area V cannot be used as electives in this program), and six elective credits. Students may use the six credits as graduate electives or transfer approved graduate courses from other colleges or universities. Off-campus programs in Educational Development and Strategies are offered at: Bradford County, Chambersburg, Lancaster, Lewistown, Harrisburg, Quakertown, Schuylkill IU 29, Wallenpaupack and Williamsport.

Instructional Technology

Barbara N. Bellucci, Ed.D.
Program Director

A candidate for the Master of Science in Education degree with a concentration in Instructional Technology must complete six credits in Area I (preferably from among ED 510, ED 512, or ED 515), one course in Area II (preferably ED 525-Educational Research) and select one course from among these three technology courses: ED 581, ED 582, ED 584. Additional required technology courses are: ED 579, ED 585, ED 587, ED 588, ED 589, a total of 30 credits. In addition to these courses, an internship, ED 591, is required for Pennsylvania Department of Education certification as a K-12 Instructional Technology Specialist (a total of 33 credits for the Master's degree with certification).

The Master's in Education with a concentration in Instructional Technology was designed to prepare educators to assume positions of technology leadership in schools. Graduates of the program have gone on to become computer coordinators in K-12 settings, or work in the computer industry, serve as technology consultants to education, business or industry, or are pursuing a doctorate in the field.

Educational Leadership

Mary A. Kropiewnicki, M.S.
Program Director

The graduate program in Educational Leadership consists of 36 credits. A candidate for this degree, which includes PA Department of Education principal certification in elementary and/or secondary education, must complete ED 514, ED 516, ED 517, ED 518 and ED 522. These are considered core courses for this degree and are prerequisites for ED 573 and 574. Students must also complete ED 576, ED 578 and ED 585 prior to registering for ED 592, Administrative Internship and Applied Research Project. This six credit course is required of all candidates for principal certification. Candidates will be recommended for principal certification upon the successful completion of: the program of study, a Pennsylvania Department of Education required principal certification exam, and 5 years of professional school experience. Off-campus programs in Educational Leadership are offered at Bethlehem School District and Northeastern IU 19. Students must follow the program outline above in order to complete all necessary prerequisites.

Qualifications for Admission to the Educational Leadership Program:

1. Successful completion of the general Wilkes University application process;
2. Miller's Analogies scores (administered during ED 516);
3. Written statement from the candidate attesting to interest and motivation to pursue a degree in educational leadership and principal certification;
4. Instructional I Teaching Certificate if seeking principalship certification;
5. At least three years full-time teaching experience if seeking principalship certification;
6. Special admission required by Program Assessment Committee for any inquiring candidate with an undergraduate degree and experience in an area other than education; and
7. Successful completion of ED 516 and ED 517.

Secondary Education

Wilkes offers Master's degree programs in: Secondary Education/Biology; Secondary Education/Chemistry; Secondary Education/English; Secondary Education/History; Secondary Education/Mathematics; and Secondary Education/Physics. 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; twelve credits must be completed in Education courses (six credits in Area I and six credits in Area II, of which three credits must be ED 522). Information about specific Secondary Education Master's degree programs is found in the Biology, Chemistry, English, History, Mathematics or Physics sections of this catalog, immediately following this section.

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. ISSUES IN EDUCATION **Three credits**
(previously titled Historical Foundations in Education)
An examination of contemporary issues in education and their historical perspectives. The development of school organizations and higher education; instructional programs and curricula; and the delivery systems and functions of education are examined in light of contemporary issues. A survey of American education from past to present are presented and future trends are considered. Required for Educational Leadership program.

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 518. SCHOOL LAW **Three credits**
(previously numbered ED 578--cannot repeat for additional credit)
An examination of school law at the federal, state and local levels; review, discussion and analysis of court decisions which affect schools. Required for Educational Leadership program

Area II - Professional Skills in Education

EDUCATION 520. EDUCATIONAL ASSESSMENT **Three credits**
(previously titled Tests and Measurements)
An examination of various assessment strategies, and current methods of assessment, through the study of theory and effective practices in assessment translated into design.

EDUCATION 521. STATISTICS IN EDUCATION **Three credits**
Correlation and regression through statistical inference.
Prerequisite: ED 520 or equivalent.

EDUCATION 522: SCHOOL CURRICULUM **Three credits**
(replaces previous ED 534 El Curr/ED 541 Sec Curr—cannot repeat for additional credit)
A study of school curricula offered in elementary and secondary education. Models and trends in curriculum development will be explored by examining past and present influences on curriculum. Participants will relate this knowledge to their own delivery of curriculum to students. Required for all programs except Instructional Technology.

EDUCATION 525. EDUCATIONAL RESEARCH **Three credits**
This course is designed to facilitate learning methods and techniques of educational research, critiquing published research and conducting a thorough and professional search for research literature on a selected topic. Recommended for Instructional Technology program.

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 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: ED 536.

Area IV - Secondary Education

EDUCATION 540. SPECIAL METHODS IN SECONDARY SCHOOL INSTRUCTION
Three credits

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

Area V - Educational Development and Strategies

NOTE: Education 541 thru Education 553 were developed by educators at Performance Learning Systems, Inc. (PLS). 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. To register in, and pay the tuition for, these PLS courses contact the Performance Learning Systems office directly in Emerson, NJ at 1-800-862-7263.

EDUCATION 541. KEYS TO MOTIVATION **Three credits**
Designed to help teachers create a motivating environment for all students. Provides understanding of students who are unmotivated to learn or participate by covering strategies which increase student involvement and motivation in learning.

EDUCATION 542. MEANINGFUL ACTIVITIES TO GENERATE INTERESTING CLASSROOMS (M. A. G. I. C.)
Three credits
A hands-on course which offers students the opportunity to learn a variety of engaging activities to go beyond textbook and workbook instruction. Participation in over 60 activities provide practice in creating, evaluating, and adapting ideas to each participant's specific curriculum.

EDUCATION 543. ACHIEVING STUDENT OUTCOMES THROUGH COOPERATIVE LEARNING **Three Credits**
Designed to encourage teachers to use cooperative strategies appropriately in classrooms. Activities include simulations, use of cooperative learning models, and creation of lesson plans.

EDUCATION 544. ADVANCED PROJECT T.E.A.C.H. LAB **Three credits**
Offers an opportunity for participants to actively practice the skills learned and utilized in Project T.E.A.C.H. Participants use the innovative techniques of storyboarding, journal writing, videotaping, live event activities and simulations in this course.
Prerequisite: Project T.E.A.C.H.

EDUCATION 545. ADVANCED TEACHING THROUGH LEARNING CHANNELS LAB
Three credits
Offers an opportunity for participants to actively practice the skills learned and utilized in Teaching Through Learning Channels.
Prerequisite: Teaching Through Learning Channels

EDUCATION 546. COACHING SKILLS FOR SUCCESSFUL TEACHING
Three credits
Develops and models strategies that help teachers share teaching ideas with one another. Participants will learn how to plan and implement coaching conferences, enhance teacher self-esteem with supportive techniques, share ideas with colleagues in a non-threatening environment and identify excellent teaching practices and grow from them.

EDUCATION 547. TEACHING THE SKILLS OF THE 21st CENTURY
Three credits
Through the use of dynamic videotape productions, activities, articles and unique survey instruments, this course looks at what students need to know and be able to do to live successfully in the 21st century. In a forum where educators can share their vision of how a curriculum should be developed and taught, the course introduces facilitations skills that ensure the successful education and enrichment of both student and teacher.

EDUCATION 548. PURPOSEFUL LEARNING THROUGH MULTIPLE INTELLIGENCES **Three credits**
Based on the research of Howard Gardner, this course focuses on understanding each of the intelligences and identifying them. Discovery centers are used to experience each intelligence and teaching strategies and classroom activities that enhance the intelligences are designed by participants.

EDUCATION 549. DISCOVERING THE POWER OF LIVE EVENT LEARNING
Three credits
This course teaches how to use active participation in real-life experiences to create lesson plans that allow students to learn through real experiences. Participants learn facilitative leadership skills which enable them to go beyond hands-on learning and simulations to incorporate real concrete experiences in their lessons which promote student problem solving and decision making.

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.

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.

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.

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.

Area VI - Educational Computing Courses

EDUCATION 526. TELECOMMUNICATIONS IN THE 21ST CENTURY Three credits
This course will show educators how they can use telecommunications in the classroom. Participants will use FTP, gopher, telnet, the World Wide Web, e-mail, newsgroups and WAIS to obtain resources in the classroom. Configuring and networking computers to the internet will be addressed. Required for Classroom Technology program.
Prerequisite: Ed 580 or equivalent.

EDUCATION 527. AUTHORING SYSTEMS/INSTRUCTIONAL DESIGN Three credits
Design and construct lessons, tutorials and presentations for the classroom utilizing authoring software such as Authorware, HyperCard, HyperStudio or Digital Chisel. Multimedia including sounds, pictures, and movies will be incorporated. Various design methodology will be explored. Required for Classroom Technology program.
Prerequisite: Ed 580 or equivalent.

EDUCATION 528. DESKTOP PUBLISHING Three credits
This introduction to Desktop Publishing course will present methods of layout and construction of newsletters, flyers, transparencies, booklets and other teacher generated classroom materials using desktop publishing software such as PageMaker or QuarkExpress. Scanning and graphics programs such as Photoshop and Illustrator will also be used in designing this course. Required for Classroom Technology program.
Prerequisite: Ed 580 or equivalent.

EDUCATION 529. DISTANCE LEARNING Three credits
This course is designed to guide students through the process of adapting their current teaching materials for TeleTeaching. Educators will learn how to prepare themselves, their students and their materials for the new teaching and learning environment.

EDUCATION 579. MEDIA DESIGN Three credits
This course is designed to give specific and realistic examples of how different types of media and instructional technology can complement each other in the computer age classroom. Emphasis will be given to the design and production of instructional materials using text, videotape, audiotape, and computer based and photographic formats for use in both distance learning and traditional classrooms. Required for Instructional Technology program.
Offered spring semesters of even years.
Prerequisite: ED 585 or equivalent

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 who lack the skills necessary for the advanced classroom technology courses.

*** Choose one course from ED 581, ED 582 or ED 584 for Instructional Technology**

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 C++ Three credits
C++ is an object-oriented programming environment that generates compiled code. C++ (and the underlying language C), has been designated as the programming language to be used in the Advanced Placement computer science examination for high school students. It is also the fastest growing language for personal computer software development. Emphasis is on application in instructional environments.
Offered in fall semesters when demand warrants.
Prerequisite: Ed 580 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. Required for Instructional Technology program.
Offered fall semesters of even years.
Prerequisite: Ed 581/Ed 582/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. INTEGRATING TECHNOLOGY INTO THE CURRICULUM Three credits
(formerly titled Microcomputer Assisted Instruction)
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. Required for Classroom Technology, Instructional Technology and Educational Leadership Programs.
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. TECHNOLOGY LEADERSHIP Three credits
Organization of instructional technology programs, facilities and resource management-including a technological in-service program. This course will also study the laws and regula-

tions which govern the selection and utilization of media, sources for funding and collaboration on development of a grant proposal. Required for Instructional Technology program.

Offered fall semesters of even years.

Prerequisite: Ed 585 or equivalent.

EDUCATION 588. OPERATING SYSTEMS & NETWORKING **Three credits**

An exploration into the design of present-day microcomputer systems. Topics include microcomputer architecture and hardware, telecommunications, networking, and general operating systems. Required for Instructional Technology program.

Offered spring semesters of odd years.

Prerequisite: Either ED 581, ED 582, ED 584 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. Required for Instructional Technology program.

Offered spring semesters of odd years.

Prerequisite: Ed 585 or equivalent.

EDUCATION 591 INTERNSHIP **Three credits**

Participation in field experience to observe the use of technology to support instruction, the management of technology resources in educational settings, and the evaluation of effectiveness of technology resources for teaching and learning; application of technology resources to support instruction in classroom settings.

Offered spring semesters. Required for PA Instructional Specialist Certification.

Prerequisites: ED 587, ED 588, ED 589 (or equivalent) and permission of Director.

Area VII - Science Education

EDUCATION 500. INTEGRATED SCIENCE METHODS AND CURRICULA FOR K-12 TEACHERS **Two credits**

Section
A - Early Childhood
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 activities 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 (Grades 9-12), 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 activities, cooperative learning, thematic connections, constructivism, team teaching, role playing, peer teaching and others.

EDUCATION 501. IMPLEMENTING SCIENCE METHODS AND CURRICULA, GRADES K-12 **One credit**

Section
A - Early Childhood
B - Elementary School
C - Middle School
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 (Grades 9-12, other curricula appropriate for Education

EDUCATION 502. PROGRAM FOR ENHANCING EDUCATIONAL LEADERSHIP IN THE SCIENCES (PEELS) **One credit**

Section
A - Early Childhood
B - Elementary School
C - Middle School
D - High School
E - Principals

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. SCIENCE AND MATHEMATICS ACTIVITIES AND METHODS **Two credits**

Section
A - Early Childhood
B - Elementary School
C - Middle School
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. CAREER ORIENTATION IN SCIENCE AND TECHNOLOGY (COST) **Three credits**

Section
A - Early Childhood
B - Elementary School
C - Middle 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. PROMOTING READING THROUGH INSTRUCTION IN SCIENCE AND MATHEMATICS (PRISM) **Two credits**

Section
A - Early Childhood
B - Elementary School
C - Middle School
D - High School

PRISM is designed to enable teachers to use hands-on science and mathematics activities 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. LOCAL SCIENCE CURRICULUM ENHANCEMENT (LSCE) **One credit**

Section
A - Early Childhood
B - Elementary School
C - Middle School
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. A MATHEMATICAL ADVENTURE THROUGH SCIENCE EDUCATION (AMASE) **Two credits**

Section A - Early Childhood C - Middle School
B - Elementary School

The Mathematical Adventure thru Science Education course will actively involve participants in hands-on investigations which exemplify 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 516. EDUCATIONAL LEADERSHIP **Three credits**

This course introduces students to research on educational leadership theory, models, and styles. Ethics in leadership, decision making models, and the principal as instructional leader are examined. The study of research methodology is incorporated and practiced to develop skills for future use in leadership plans of study. **Required for Educational Leadership program.**

Prerequisite: Enrollment in the Educational Leadership program.

EDUCATION 517. THE PRINCIPALSHIP **Three credits**

This course introduces students to the role and responsibilities of the principal. Theory is transferred to practice through the use of case study and in-basket/out-basket assignments which will address critical issues in educational leadership. The use of leadership knowledge and skills are developed through the study of the principal's role in shaping the school culture & climate, developing a shared vision, managing group dynamics, and maintaining a safe & orderly learning environment. **Required for Educational Leadership program.**

Prerequisite: Ed 516

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. EDUCATIONAL ASSESSMENT AND PROGRAM EVALUATION **Three credits**

Students will undertake advanced study in educational assessment strategies and program evaluation. Instruction will focus on the principal's role in guiding teachers in the design of

effective assessments and alternative assessment strategies, and the use of assessment in program evaluation. Working in collaboration with faculty, colleagues, and a practicing administrator, students will design a leadership plan of study for a topic in this area. The plan of study must directly relate to the role and responsibilities of the principal in this capacity. Sample topics can be drawn from such areas as: student assessment methods, evaluation of special and regular education programs, academic standards and the PA Assessment System or other related topics. **Required for Educational Leadership program.**

Prerequisites 15 credits: ED 514, 516, 517, 518, 522 or equivalent.

EDUCATION 574. SCHOOL/COMMUNITY RELATIONS **Three credits**

Students will study the role of the principal in establishing and maintaining positive school and community relations. Instruction will be provided on positive public relations and in effective communications techniques. Working in collaboration with faculty, colleagues and a practicing administrator, students will design a leadership plan of study for a topic related to this area. The plan of study must directly relate to the role and responsibilities of the principal in this capacity. Sample topics can be drawn from such areas as: needs assessments, communication systems, parent involvement, school partnerships, or other related topics. **Required for Educational Leadership program.**

Prerequisites 15 credits: ED 514, 516, 517, 518, 522 or equivalent.

EDUCATION 576. SITE MANAGEMENT **Three credits**

This course focuses on the study of administrative functions in educational institutions. Topics covered are budget planning, facilities management, resource allocation & scheduling. School finance and sources of revenue for schools are examined as they impact the allocation of resources and scheduling of programs. **Required for Educational Leadership program.**

Prerequisites 15 credits: ED 514, 516, 517, 518, 522 or equivalent.

EDUCATION 578. STAFF DEVELOPMENT AND SUPERVISION **Three credits**

(If you previously completed School Law as ED 578 you must repeat ED 578-Staff Development & Supervision for the Educational Leadership program)

This course focuses on staff development and teacher supervision. Models of supervision, such as clinical supervision and differentiated supervision, are examined. Case studies will be utilized to gain understanding of the teacher evaluation process. Mentoring and new teacher induction programs will be investigated. An overview of the laws and policies which influence and govern these programs will be included. **Required for Educational Leadership program.**

Prerequisites 15 credits: ED 514, 516, 517, 518, 522 or equivalent.

EDUCATION 590. THESIS **Three credits**

EDUCATION 592. ADMINISTRATIVE INTERNSHIP AND APPLIED RESEARCH PROJECT **Six credits**

Students will complete work as an administrative intern with a practicing principal at their expected level of certification: elementary and/or secondary. Within this experience, students will design a leadership plan of study to implement a research-based project which will attest to their ability to perform as an educational leader. The project is to address the needs of the candidate, as well as the needs of the school where the internship is being complete. Required for Educational Leadership program.

Prerequisites: Completion of the 30 required program credits and permission of the Program Director.

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 as electives to meet degree requirements. Credit is given at the rate of one-half semester hour for each eight hours of classwork.

Biology/Secondary Education Lester J. Turoczi, Ph.D., Chairperson

Master of Science in Education

Admission
Refer to the general admission requirements on page 6.

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 31.

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, evolution, 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.

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 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 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 in alternate summers.

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/Secondary Education

Roger L. Maxwell, Ph.D., Chairperson

Master of Science in Education

Admission

Refer to the general admission requirements on page 6.

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 25. 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. ADVANCED INORGANIC CHEMISTRY LABORATORY **One credit**

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.

English/Secondary Education

Darin E.Fields, Ph.D., Chairperson

Master of Science in Education

Admission

Refer to the general admission requirements on page **6**.

Degree Requirements

Candidates for the degree of Master of Science in Education with a concentration in Secondary Education/English must take eighteen hours of English in courses numbered 400 or above.

Requirements for the education component of the Master of Science in Education with a major in English, are listed under Education on page **26**.

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 CENTURYPROSE AND POETRY **Three credits**

Study of major authors and literary traditions of the eighteenth century.

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**

Study of major writers, works, and topics of the Victorian era.

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-modern 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 1660-1780.

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 468. CONTEMPORARY DRAMA **Three credits**

A study of dramatic literature from the 1960s to the present. Works and major figures from British, American and world drama may be included to reflect the diversity of the plays and playwrights of the period.

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/Secondary Education Darin E. Fields, Ph.D., Chairperson

Master of Science in Education

Admission

Refer to the general admission requirements on page **6**.

Degree Requirements

Candidates for the degree of Master of Science in Education with a concentration in Secondary Education/History must take eighteen hours of history in courses numbered 400 or above. Requirements for the education component of the Master of Science in Education with a major in history, are listed under Education on page **26**.

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. HISTORY OF EASTERN EUROPE **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. HISTORY OF THE BALKANS **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 Revolution 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.

Mathematics/Secondary Education

Stephen J. Tillman, Ph.D., Chairperson

Master of Science in Education

For information, see Mathematics on page 51.

Physics/Secondary Education

Roger Maxwell, Ph.D., Chairperson

Master of Science in Education

Admission

For admission to graduate study in Secondary Education/Physics, the applicant should possess an undergraduate degree in physics or in a 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 25. 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.

Electrical and Computer Engineering

Roger Maxwell, Ph.D., Chairperson
Thyagarajan Srinivasan, Ph.D., Program Director

Master of Science in Electrical Engineering (MSEE)

Accreditation

The MSEE program is accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board of Engineering and Technology (ABET).

Courses are available days and evenings.

Admission

In addition to the general admission requirements on page 6, applicants should possess a B.S. degree in Electrical Engineering from an accredited institution. Applicants not meeting the requirements 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:

09 credits	EE 401, EE 410, and EE 460
21 credits	Distributed as follows according to option

Non-thesis option: 21 credit hours to be taken from graduate level EE and CS courses with one of the following courses allowed from business: BA 501 or BA 507.

Thesis option: Six hours of thesis (EE 590) are required. Fifteen credits will be taken from graduate-level EE and CS courses with one of the following courses allowed from business: BA 501 or BA 507. The thesis shall be defended in an open forum. Three faculty members constitute a thesis committee with the thesis advisor as chair.

Students who opt to complete a thesis may select from posted research topics or proposed areas of interest of the faculty and submit a proposal of their thesis to the Department. Final decision of topic and advisor will be taken by the Department in accordance with Department 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.

Both full- and part-time students are limited to a maximum of three thesis credits in any single semester.

The minimum acceptable grade point average is 3.0. (See Retention Policy, page 10.)

Advanced standing or transfer credit is limited to six (6) graduate credits. Petitions should be submitted to the Engineering and Physics Department 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.

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).

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 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.

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.

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 241.

EE 442. 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 429)

Prerequisite: EE 345.

EE 444. 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. (same as CS 426)

Prerequisite: EE 343/CS 227.

EE 445. COMPUTER ORGANIZATION **Three credits**

Number representation, digital storage devices and computational units, bus structures; execution sequences and assembly language concepts; control units with horizontal and vertical microcoding; addressing principles and sequencing; microprocessors; basic input and output devices; interrupts; survey of RISC principles including pipelined execution. Three hours lecture a week. (same as CS 445)

Prerequisite: EE 241.

EE 446. COMPUTER ARCHITECTURE **Three credits**

A study of the design, organization, and architecture of computers, ranging from the microprocessors to the latest "supercomputers." (same as CS 430)

Prerequisite: EE 242 or EE 342.

EE 448. SOFTWARE ENGINEERING **Three credits**

A course in "programming in the large". Topics include software design, implementation, validation, maintenance, and documentation. There will be one or more team projects. (same as CS 434)

Prerequisite: CS 324.

Offered every spring.

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.

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 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 371.

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 241, EE 371.

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 371.

EE 482. ADVANCED COMMUNICATION AND ANTENNA LAB **Three credits**

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.

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.

Five-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

Stephen J. Tillman, 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 6.

1. Master of Science in Mathematics

   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 XX.

Degree Requirements

General degree requirements are described on page 10.

1. **Master of Science in Mathematics**

   Thirty credits of courses offered by the Department of Mathematics/ Computer Science are required, including six credits in courses numbered 500 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 thirty credits may be earned through thesis work. Students electing this option must also satisfy all general thesis requirements as described on pages 10 and 12.

2. **Master of Science in Education**

   The Department of Education degree requirements are described on page 31. Of the required thirty credits, eighteen must be in approved courses offered by the Department of Mathematics/Computer Science.

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 411. REAL ANALYSIS **Four credits**

A rigorous study of the topology of the real line, limits, continuity, differentiation, integration, and series of functions.

Offered fall of even years.

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 when demand warrants.

MTH 431. ABSTRACT ALGEBRA I **Four credits**

A rigorous study of elementary number theory, groups, rings, and fields.

Offered fall of odd 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 443. GEOMETRY **Three credits**

A study of selected topics from Euclidean and non-Euclidean geometry.

Offered in the fall semester of even years.

MTH 451. PROBABILITY AND MATHEMATICAL STATISTICS I **Three credits**

Random variables, probability distributions, expectation and limit theorems, confidence intervals.

Offered fall of even years.

MTH 452. 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 454. 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 460. 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 460)

Prerequisite: Programming experience in a high-level language.

Offered in the fall semester of even years.

MTH 461 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.

Offered in the fall semester of odd years.

MTH 462. APPLIED MATHEMATICS II **Three credits**

Intended for physical science and engineering students. Topics includesystems of linear differential equations; nonlinear differential equations;qualitative, numerical, and finite dif-

ference methods; theorems of Green and Stokes and the Divergence Theorem.
Offered in the spring semester of even years.

MTH 463. 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 463)
Prerequisite: Programming experience in a high-level language.
Offered spring of odd years.

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 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 419. 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 421. 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 423. 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 424. 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 425. 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 426. 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 444).
Prerequisite: Computer Data Structures.
Offered in the fall semester of odd years.

CS 427. 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 428. 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 429. 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. (same as EE 442)

Prerequisite: CS 320/EE 341.

Offered every spring.

CS 430. 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 434. SOFTWARE ENGINEERING **Three credits**

A course in "programming in the large". Topics include software design, implementation, validation, maintenance and documentation. There will be one or more team projects. (same as EE 448)

Prerequisite CS 324.

Offered every spring.

CS 435. 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 odd years.

CS 440. 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.

Prerequisite: Knowledge of computer data structures.

Offered in the spring semester of even years.

CS 445. COMPUTER ORGANIZATION **Three credits**

Number representation, digital storage devices and computational units, bus structures;execution sequences and assembly language concepts;control units with horizontal and vertical microcoding; addressing principles and sequencing; microprocessors; basic input and output devices; interrupts; survey of RISC principles including pipelined execution. Three hours lecture a week. (same as EE 445)

Prerequisite: Knowledge of digital design.

CS 450. 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 455. 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.

Prerequisite: Knowledge of computer data structures.

Offered every spring.

CS 460. 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 460)

Prequisite: Programming experience in a high-level language.

Offered in the fall semester of even years.

CS 463. 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 463)

Prerequisite: Programming experience in a high-level language.

Offered spring of odd years.

CS 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 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 467. 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 495-496. 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 498. 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.

Nursing

Mary Ann Merrigan, Ph.D., R.N., Chairperson
Sharon G. Telban, D.Ed., R.N.C., Program Director

Master of Science with Major in Nursing

The Wilkes University Department of Nursing has been granted preliminary approval by the Commission of Collegiate Nursing Education (CCNE). Preliminary approval is a form of initial recognition offered by CCNE provided to baccalaureate and graduate nursing education programs during the transitional phase of the development of the CCNE accreditation process. Programs seeking this category of recognition had until December 1, 1997 to apply for preliminary approval, which was granted by CCNE in early 1998. Preliminary approval is not accreditation and extends until the program's first scheduled comprehensive accreditation review. Preliminary approval is designed to be a temporary status and provides an indication that programs have been reviewed by the Commission and have met, at least, the following general requirements:

- The nursing education program is viable and appears, based upon the review of submitted materials, to be conducted in a manner that will enable eventual compliance with CCNE accreditation standards.
- The institution has a history of seeking and ensuring continuing accreditation and program recognition by appropriate accrediting and regulatory agencies.
- The institution has ensured the continuing viablity of the nursing education program by being responsive to the concerns of accrediting and regulatory agencies.

For further information about the preliminary approval status of the program, please contact the Commission on Collegiate Nursing Education at the following address:

Commission on Collegiate Nursing Education
One Dupont Circle, NW, Suite 530, Washington, DC, 20036-1120
(202) 887-6791

Purpose

The purpose of the graduate program in Nursing at Wilkes University includes preparation of an advanced practitioner in the role of Clinical Nurse Specialist. Both concentrations 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. In the role of Clinical Nurse Specialist advanced practice focuses on Gerontological Nursing.

Multidisciplinary in approach, the program encourages individual choice based upon the personal interests and career goals of students. Flexible scheduling of courses enhances the ability of students to complete the Clinical Nurse Specialist program requirements while maintaining employment or full-time study.

Program Outcomes

1. Synthesize advanced knowledge of nursing and related disciplines in the development of advanced practice nursing for the roles of the Clinical Nurse Specialist.
2. Develop clinical expertise as an advanced practice nurse in the role of Clinical Nurse Specialist.
3. Develop skills and abilities to assume the role of the Advanced Practice Nurse.
4. Evaluate nursing research for its applicability to advanced practice nursing.
5. Evaluate applicable knowledge and concepts in nursing to deal with the complexities of a dynamic society.
6. Participate in life-long learning as a part of advanced practice nursing.

Admission Requirements

In addition to the requirements of the Graduate Division, admission to the Master's 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 Examination (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 Curriculum (36 credits)

The Core (18 credits)

N501:	Theoretical Foundations of Nursing	3 credits
N502:	Application of Nursing Research	3 credits
N504:	Advanced Role Development in Nursing	3 credits
N505:	Current Perspectives in Nursing	3 credits
HSA 508:	Quantitative and Applied Methods in Health Administration (see course description on page XX)	3 credits
N590:	Scholarly Project	3 credits

Advanced Practice Core (15 credits)

N406:	Health Assessment of the Elderly	3 credits
N511:	Perspectives on Aging	3 credits
N506:	Advanced Practice in Gerontological Nursing I	3 credits
N515:	Advanced Practice in Gerontological Nursing II	3 credits
N533	Pharmacotherapeutics for Nursing	3 credits

Elective Courses (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 respects the physical assessment of the elderly is no different from the young adult. However, the greater incidence of disease and infirmity 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 508.

NURSING 504. ADVANCED ROLE DEVELOPMENT IN NURSING **Three credits**

Examines the role development process and its applicability to the advanced practice nurse. The historical, theoretical, and conceptual basis of role development, advanced practice, and evaluation are explored. A framework for practice, which includes the sub-roles of direct care provider, 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. ADVANCED PRACTICE IN GERONTOLOGICAL NURSING I **Three credits**

Students use theories from nursing and other sciences to plan, manage, and evaluate direct care services provided to older adults and their families in community settings. Clinical experience focuses on case management, including advanced assessment, diagnosis, planning and evaluation as it relates to health promotion and maintenance in this population. Opportunities for interdisciplinary experience and collaborative practice are provided. The seminar component of the course is designed to develop clinical decision-making skills through case study presentations and extend the theoretical and research base of advanced clinical practice.

Prerequisites: NSG 406, 501, and 511 (May take NSG 504 concurrently)

NURSING 511. 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.

NURSING 515. ADVANCED PRACTICE IN GERONTOLOGICAL NURSING II **Three credits**

Students use theories from nursing and other sciences to plan, manage and evaluate direct care services provided to frail older adults and their families in institutional and community settings. Clinical experience focuses on case management, including advanced assessment, diagnosis, planning and evaluation as it relates to the management of acute conditions and complex chronic health problems. Opportunites for interdisciplinary experiences and collaborative practice are provided. The seminar component of the course is designed to develop clinical decision-making skills through case study presentations and to extend the theoretical and research base of advanced clinical practice.

Prerequisites: NSG 406, 501, and 511 (May take NSG 504 concurrently)

NURSING 530. PRINCIPLES AND PRACTICES OF ADULT EDUCATION **Three credits**

This elective course examines research and theory in adult education which serve as a basis for program development and design. It includes teaching/learning strategies, legal/ethical issues, marketing and sources of funding for adult education programs.

NURSING 531. MENTAL HEALTH IN THE ELDERLY **Three credits**

This elective course presents an overview of mental helath and aging that is grounded in an integrated biopsychosocial approach to human behavior. Deigned to bring professionals up to date on society's approach to the basic issues that confront those in the field of aging, it features exploration of issues related to prevention, recognition, and management of major psychiatric disorders affecting the elderly in a variety of settings. Content includes tools for assessment of mental health and functional status and responses to problematic behaviors. Research related to course topics will be evaluated in terms of its applicability to clinical practice.

NURSING 533. PHARMACOTHERAPEUTICS FOR NURSING **Three credits**

The basic concepts of clinical pharmacokinetics and its application in drug regimen design and monitoring are discussed in this required course. Pharmacotherapy for major diseases of geriatric patients is emphasized. A case study approach is utilized to emphasize the application of pharmacotherapy and nursing concepts in patient care.

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 advanced nursing practice will be addressed. Each student will present their project upon its completion.

Prerequisite: NSG 506 or NSG 515 and consent of instructor.

NURSING 596-596. 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.

RN-MS Program

This accelerated program is designed for the experienced, practicing registered nurse who plans to continue nursing studies through the master's level and does not hold a baccalaureate degree.Adjustments of the undergraduate requirements permit rapid progress into the graduate level. The Master's Program in the Clinical Nurse Specialist (CNS) concentration remains intact and prepares an advanced practice nurse. Program plans are individualized for each student. Time to complete the program is related to the applicability of transfer credit as well as the number of credits taken in any semester.

An interview with the Program Director is required prior to entry into the program. Formal admission to Wilkes University is necessary and will include evaluation of transfer credits.

Prerequisites for admission into the program:

1. Graduation from a regionally accredited nursing program.
2. Licensure as a Registered Nurse.
3. At least three (3) years of clinical practice after graduation.
4. A GPA from the original program of 3.0 on a 4.0 scale.
5. A statement of professional goals. (These goals should relate to the graduate program (CNS) at Wilkes.)

Wilkes University Graduate Program Administration

Dr. Christopher N. Breiseth, President	
Dr. J. Michael Lennon, Vice President for Academic Affairs	(570) 408-4200
Dr. Bonnie C. Bedford, Dean of Graduate Studies	(570) 408-4600
Dr. Harold E. Cox, Coordinator of Graduate Programs	(570) 408-4226
Ms. Kathleen J. Diekhaus, Graduate Secretary	(570) 408-4160
Mr. C. Russell Havey, MBA Program	(570) 408-4719
Dr. Joseph T. Bellucci, Education Program	(570) 408-4670
Dr. Thyagarajan Srinivasan, Electrical Engineering	(570) 408-4811
Dr. Stephen J. Tillman, Mathematics Program	(570) 408-4830
Dr. Mary Ann T. Merrigan, Nursing Program	(570) 408-4070

Administrative Support Offices
(570) 831-5000

Admissions
Extension 4400
Chase Hall
184 South River Street

International Student Advisor
Extension 4107
Second Floor, Conyngham Hall
130 South River Street

Financial Management Office
Extension 4650
Second Floor, Passan Hall
267 South Franklin Street
Fax: (570) 408-4902

Registrar's Office
Extension 4853
Passan Hall
267 South Franklin Street
Fax: (570) 408-7885

Financial Aid Office
Extension 4345
Third Floor, Passan Hall
267 South Franklin Street
Fax: (570) 408-4902

Graduate Records
Extension 4160
Capin Hall 203
165 South Franklin Street

WILKES UNIVERSITY CALENDAR — 1999-2000

FALL SEMESTER 1999		
Classes Commence	Monday August 30, 1999	8:00 a.m.
Labor Day Recess	Friday, September 3, 1999	5:00 p.m.
Classes Resume	Tuesday, September 7, 1999	8:00 a.m.
Fall Recess	Friday, October 8, 1999	5:00 p.m.
Classes Resume	Tuesday, October 12, 1999	8:00 a.m.
FOLLOW MONDAY CLASS SCHEDULE		
	Tuesday, November 23, 1999	
Thanksgiving Recess	Tuesday, November 23, 1999	10:00 p.m.
Classes Resume	Monday, November 29, 1999	8:00 a.m.
Classes End	Friday, December 10, 1999	5:00 p.m.
Final Examinations Begin	Monday, December 13, 1999	8:00 a.m.
Final Examinations End	Tuesday December 21, 1999	4:30 p.m.
SPRING SEMESTER 2000		
Classes Commence	Monday, January 17, 2000	8:00 a.m.
Winter Commencement	Thursday, January 20, 2000	11:15 a.m.
Spring Recess	Friday, March 3, 2000	5:00 p.m.
Classes Resume	Monday, March 13, 2000	8:00 a.m.
Easter Recess	Wednesday, April 19, 2000	10:00 p.m.
Classes Resume	Tuesday, April 25, 2000	8:00 a.m.
FOLLOW THURSDAY CLASS SCHEDULE		
	Tuesday, May 2, 2000	
FOLLOW FRIDAY CLASS SCHEDULE		
	Wednesday, May 3, 2000	
Classes End	Wednesday, May 3, 2000	5:00 p.m.
Final Examinations Begin	Friday, May 5, 2000	8:00 a.m.
Final Examinations End	Saturday, May 13, 2000	4:30 p.m.
COMMENCEMENT	Saturdaym May 20, 2000	11:00 a.m.

Statement of Disclaimer

The statements in this bulletin are for the 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.

Wilkes University
Graduate Bulletin

Errata

Page17, MBA 500. Replace *Note* with:

Note: Students will be exempted from this course if they have achieved a grade of C or better within the past five years in undergraduate courses in financial accounting, managerial accounting, and one other upper level accounting course.

Page 18, MBA 510. Replace *Note* with:

Note: Students will be exempted if they have achieved a grade of C or better within the past five years *in undergraduate courses in statistics, production and operations management, and management information systems.*

Page 18, MBA 530. Corrected *Note* should read:

Note: Students will be exempted from this course if they have achieved a grade of C or better within the past five years in undergraduate courses in macroeconomics and microeconomics.

Page 18, MBA 550. Corrected *Note* should read:

Note: Students will be exempted from this course if they have achieved a grade of C or better within the past five years in an undergraduate course in principles of management.

Page 19, MBA 513. Corrected Prerequisite should read:

Prerequisite: MBA 510

Page 62, MBA Director: Mr. C. Russel Havey, MBA Program (570) 408-4701.

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Wilkes-Barre
Pennsylvania 18766

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