

Exhibit B

THE UNIVERSITY OF AKRON

1991-92

Graduate Bulletin



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JOHN BUCHTEL

1876-1992

WILLIAMSON COLLEGE

Calendar 1991-92

Fall Semester 1991

*Labor Day	Mon., Sept. 2
Day and Evening Classes Begin	Tues., Sept. 3
Veterans Day (staff holiday)	Mon., Nov. 11
**Thanksgiving Break	Thurs.-Sat., Nov. 28-30
Classes Resume	Mon., Dec. 2
Final Instructional Day	Sat., Dec. 14
Final Examination Period	Mon.-Sat., Dec. 16-21
Commencement	Sat., Dec. 21
Spring Intersession	Mon.-Fri., Jan. 6-17

Spring Semester 1992

*Martin Luther King Day	Mon., Jan. 20
Day and Evening Classes	Tues., Jan. 21
Spring Break	Mon.-Sat., March 23-28
Founders Day	Fri., May 8
***May Day	Fri., May 8
Final Instructional Day	Sat., May 9
Final Examination Period	Mon.-Sat., May 11-16
Summer Intersession	Mon.-Fri., May 18-June 12
Commencement for Law School	Sat., May 23
Commencement	Sat., May 16

Summer Session I

First 5- and 8-Week Sessions Begin	Mon., June 15
*Independence Day	Fri., July 3
First 5-Week Session Ends	Fri., July 17

Summer Session II

Second 5-Week Session Begins	Mon., July 20
Eight-Week Session Ends	Fri., Aug. 7
Second 5-Week Session Ends	Fri., Aug. 21

Fall Semester 1992

Classes Begin	Mon., Aug. 31
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The *Graduate Bulletin* is a supplement to The University of Akron *General Bulletin*. The *General Bulletin* contains information on undergraduate degree programs, non-degree continuing education programs, and additional information on the policies of The University of Akron.

For a copy of the *General Bulletin* contact the Office of Admissions, 166 Fir Hill, Akron, OH 44325, (216) 972-7100.

Inquiries

Address inquiries concerning:

Graduate study to the Graduate School, Fir Hill Center, (216) 972-7663.

Admissions information, campus tours, and housing, transfer of credits to the Office of Admissions, 166 Fir Hill (216) 972-7100.

Financial aid, scholarships, loans, and student employment to the Office of Student Financial Aid and Employment, Spicer Hall (216) 972-7032.

Athletics to the Athletic Director, James A. Rhodes Health and Physical Education Building, (216) 972-7080.

Registration, scheduling, residency requirements, and veteran's affairs to the Office of the Registrar, Spicer Hall, (216) 972-7844.

Continuing education and noncredit programs to Buckingham Center for Continuing Education, (216) 972-7171.

The University switchboard number is (216) 972-7111.

The University of Akron
Akron, OH 44325

*University closed

**University closed from Wednesday, November 27 at 5 p.m. until Monday, December 2 at 7 a.m.

***Classes cancelled from noon to 5 p.m.

While every effort is made to provide accurate and up-to-date information, the University reserves the right to change, without notice, statements in the Bulletin Series which include, but are not limited to rules, policies, procedures, fees, curricula, courses, programs, activities, services, schedules, course availability or other matters. For example, courses may be closed due to limited resources or facilities or cancelled because of the unavailability of faculty or insufficient enrollment.

The University of Akron Bulletin
(USPS 620-400)

Vol. XXX

September 1991

POSTMASTER:

Send address changes to *The University of Akron Bulletin*, Office of Admissions, The University of Akron, Akron, OH 44325-2001.

SECTION

One

Background information



Background

HISTORY

The self-conscious connection between The University of Akron and its surrounding community has been a recurring theme from the institution's founding as a small denominational college in 1870 to its current standing as a major metropolitan state university. It is significant that the efforts, energy, and financial support of an Akron manufacturer of farm equipment, John R. Buchtel, were instrumental in persuading the Ohio Universalist Convention to build its college on a hill overlooking the town stretched along the Ohio Canal. The grateful trustees responded by naming the school Buchtel College. It is also significant that during its first four decades, the struggling institution was repeatedly aided in its efforts to survive by various local entrepreneurs who pioneered and prospered in such industries as cereals, clay products, matches, and rubber. Buchtel College's emphasis on local rather than denominational interests became increasingly clear, and by 1913 those strong ties and the school's financial situation caused its trustees to transfer the institution and its assets to the city. For the next 50 years, the Municipal University of Akron received its principal support from city tax funds and swelled from an enrollment of 198 to nearly 10,000.

The growth of the college paralleled the remarkable expansion of the community itself. From 1910 to 1920 Akron was the fastest-growing city in the country, evolving from a thriving canal town of 70,000 to a major manufacturing center of 208,000, thanks in large part to a boom in local factories that bore names such as Goodyear, Firestone, Goodrich, and others. The age of the automobile — and the demand for inflatable rubber tires — changed the complexion of Akron forever.

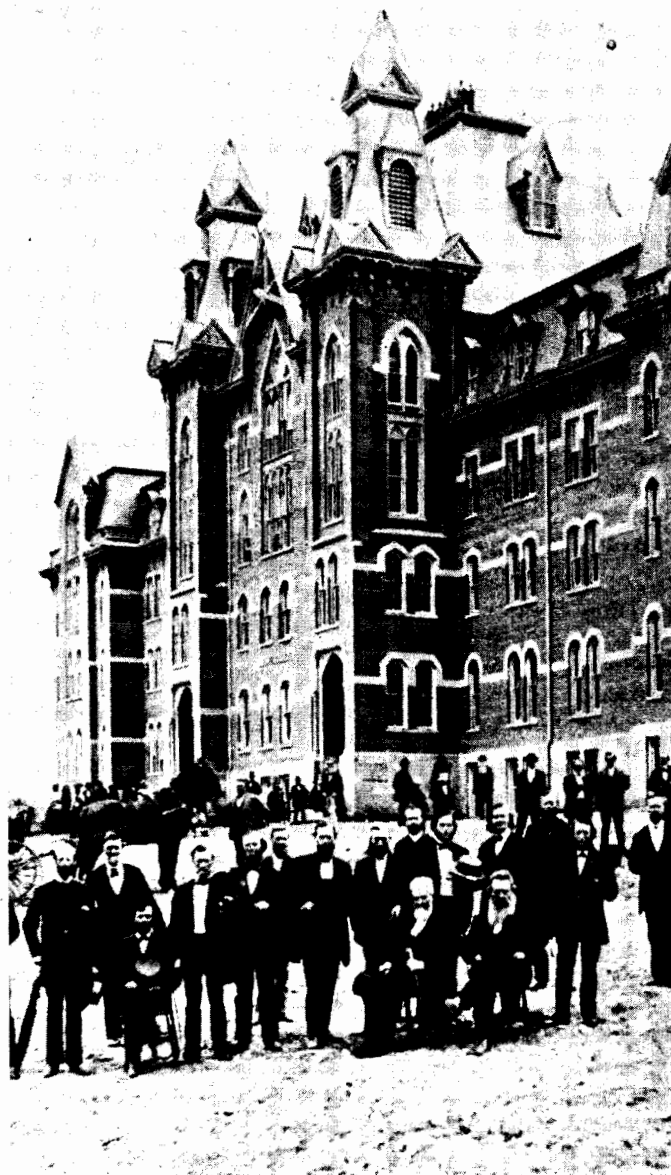
And changes within the Municipal University's curriculum reflected the strong interrelationship of town and gown. In 1914 a College of Engineering began instruction, and other professional schools followed: education (1921), business administration (1953), law (1959), the Community and Technical College (1964), fine and applied arts (1967), nursing (1967), and polymers (1988).

Considering the institution's location in the heart of the burgeoning rubber industry, it seemed only appropriate that the world's first courses in rubber chemistry would be offered at Buchtel College in 1909. From those first classes in Professor Charles W. Knight's laboratory would evolve the prestigious College of Polymer Science and Polymer Engineering (1988), a world leader in polymer research. In the 1930s and 1940s, with the establishment in Akron of the Guggenheim Airship Institute, UA scientists studied the structure and design of zeppelins, and during World War II University of Akron researchers helped fill a critical need in the U.S. war effort by contributing to the development of synthetic rubber.

But research, innovation, and creative activity take many forms at the University, in the sciences and in the arts and humanities as well. Today UA faculty members study ways of matching workers with jobs to maximize performance; they devise more effective methods of extracting oil from shale; they write and produce plays, pen poetry, choreograph dance works; they design valves for artificial hearts and explore improved methods of tumor detection; they evaluate the quality of water in Northeast Ohio; they draft new maps to meet specialized needs of local businesses and industries; and they study laws of taxation and their effects on commerce. UA's continuing and central commitment to the liberal arts is signified by the perpetuation of the institution's original name in the Buchtel College of Arts and Sciences.

And the University has maintained an openness to innovation in other ways. As early as the 1880s Buchtel College was liberalizing its curriculum by allowing students to choose free electives within their courses of study. The University later adopted and developed the general education concept, which represents an attempt to prepare students for both their personal and their professional lives by providing a balance between courses that teach them how to make a living and courses that teach them about life as we know it in Western civilization.

The University's first doctoral degree was, appropriately enough, awarded in polymer chemistry in 1959, but master's degrees were granted as early as 1882. Doctoral work has now expanded to programs leading to the highest academic degree in 18 different fields of study.



In 1963 the receipt of state tax monies made UA a state-assisted municipal university, and on July 1, 1967, The University of Akron officially became a state university. Today nearly 29,000 students from 43 states and 83 foreign countries are enrolled in its 10 colleges, making it the third largest university in Ohio, and 46th largest in the nation. Its 80,000 alumni are worldwide. The 162-acre main campus with its 77 modern buildings is within walking distance of downtown Akron and its shopping, restaurants, entertainment, and cultural centers. The Northeast Ohio metropolitan area, with its 1.5 million population, provides numerous opportunities in recreation, major collegiate, amateur and professional sports, concerts, cultural events, and commerce, all within easy driving distance and many accessible via public transportation.

For more than a century, the college on the hill has been an integral part of the city whose name it bears, an active participant in Akron's renaissance of commercial and artistic endeavor, a leader in the city's intellectual and professional advancement, a center for internationally lauded research efforts, a source of enrichment, education, and vitality both for itself and for its community. Our history is a long and proud one — but at The University of Akron, our eyes are on the future, for our students, our faculty and staff, our community, our world.

The Campus

During recent years, the University campus has undergone many major changes. In 1951, the University's 13 acres encompassed only 10 buildings. Currently, the main campus covers 166 acres, and includes 80 buildings, with plans to renovate and build additional academic, recreational, and parking facilities. The campus is illuminated at night and security personnel patrol the area hourly.

LOCATION

The University is situated in a large metropolitan area. The campus, although centrally located within the city, is set apart from the downtown area. Students have easy access to retail outlets, transportation, and churches. Akron is easily reached by automobile from major national east-west routes (Interstates 80, 90, 76, and the Ohio Turnpike), and north-south routes (Interstates 71 and 77), all of which link Akron to the surrounding states and regions. The University itself is located between East Buchtel Avenue and Carroll Street in the downtown area. For airline passengers, limousine service from the Cleveland-Hopkins International Airport and the Akron-Canton Airport, south of Akron, is available.

BUILDINGS

Many of the buildings on campus bear the names of prominent persons who are recognized for their contributions in administration, education, business, science, or University service. Major buildings include:

Admissions Building. This office is located at 381 Buchtel Common. The Office of Admissions assists students with applications, requirements, and procedures for undergraduate, postbaccalaureate, guest, transfer, auditing, or special student status.

Auburn Science and Engineering Center. Named for Norman P. Auburn, 10th president of the University, this complex is one of the largest academic buildings in the state. The center houses the College of Engineering, the Department of Biology, and the scientific and engineering holdings of the University library.

Ayer Hall. Named for the first dean of the College of Engineering, Frederic E. Ayer, Ayer Hall provides classrooms and offices for the mathematics and physics departments.

Ballet Center. This center, located at 354 East Market Street, houses dance studios, a choreography laboratory, faculty offices, studios, and offices for the Ohio Ballet and the Dance Institute.

Bierce Library. Named for Gen. Lucius V. Bierce, an Akron mayor, lawyer, historian, state senator, philosopher, philanthropist, and soldier, the building opened in spring 1973. In addition to the book and periodical collections, the facility houses archival and audio-visual materials, maps, and microforms. The University library, including the Science and Technology Department, has holdings of more than 2.8 million items.

Buchtel Hall. Originally built in 1870, this structure was destroyed by fire in 1899 and rebuilt in 1901 (Buchtel Hall II). The administrative center of the campus, Buchtel Hall (III) was completely restored in 1973 following a devastating fire in 1971. It is the University's link with Buchtel College. It provides office space for numerous administrative officials of the University.

Buckingham Center for Continuing Education. The center was renovated in 1979 at a cost of \$2.8 million. The building houses offices for the executive dean of Continuing Education, Public Services and Outreach, the Adult Resource Center, the Office for Noncredit Courses, the Long Term Care Education & Training Center, the Law School Clinical Program, as well as a lecture hall and general classrooms.

Business Administration Building. A new \$9.1 million business administration building, located at 259 South Broadway, opened in spring 1991. This structure consolidates office, classroom, and laboratory facilities for the dean of the College of Business Administration, the School of Accountancy, and the departments of finance, marketing, and management.

Carroll Hall. Adjacent to the Gardner Student Center, Carroll Hall houses classrooms, laboratories, and offices for the departments of counseling and special education, geography, developmental programs, and computer-based education, as well as the University's media services, electronic systems, and the Learning Resources Center.

Central Services Building. This building, at 185 South Forge Street, houses the administrative service departments of central stores, printing services, and mail room.

Computer Center. Purchased and renovated in 1981 for \$1.3 million, this building at 185 Carroll Street houses the University's computer center offices, main computer, and workrooms, as well as student and faculty keypunch areas and time-sharing terminals.

Crouse Hall. Crouse Hall houses the Department of Geology, Center for Environmental Studies, classrooms, and some offices for the College of Education.

East Hall. Located on South Union Street, the hall houses the University nursery school, Black Cultural Center, and University Honors Program.

Edwin J. Thomas Performing Arts Hall. Named for Edwin J. Thomas, prominent industrialist and dedicated member of the University Board of Trustees from 1952 to 1975, this cultural center, which cost more than \$13.9 million, was formally opened in 1973. Designed to accommodate concerts, opera, ballet, and theatre productions, the hall is a masterpiece in architecture, acoustics, and creative mechanisms. It stands at the corner of East Center and Hill Streets.

Exchange Building. This recently acquired building at 222 East Exchange Street houses the School of Social Work.



Fir Hill Center. This recently remodeled building, north of East Buchtel Avenue at Fir Hill, houses the offices of the Associate Vice President for Research and Graduate Studies, the dean of the Graduate School, and Research Services and Sponsored Programs.

Firestone Conservatory. On the first floor of Guzzetta Hall, this facility provides classrooms, practice rooms, and offices for music.

Folk Hall. This recently remodeled building at 150 East Exchange Street provides modern, well-equipped School of Art facilities in one location. Studios are available for graphic arts, photography, drawing, painting, metalsmithing, ceramics, and weaving. The Davis Art Gallery is also located in the facility.

Forge Building. This building at 171 South Forge Street houses the College of Engineering's Construction Technology Program, including offices and computer lab and classroom space.

Gallucci Hall. This building at 200 East Exchange Street, formerly a Holiday Inn, is a coed residence hall. The north wing houses the Department of Urban Studies, the Center for Urban Studies, and the Department of Hospitality Management.

Gardner Student Center. This complex was named for Donfred H. Gardner, who was appointed dean of men in 1926, named the University's first dean of students in 1937, in 1955 named the University's first dean of administration, and later, in 1959, promoted to vice president. He retired in 1962. This facility, which serves as a unifying force in the life of the institution, houses nearly 80 percent of all nonacademic activities on campus. It provides bowling alleys, meeting rooms, lounges, student activity and publication offices and workrooms, a game and billiard room, a bookstore, bank facilities, the Perkins Art Gallery, the Gardner Theatre, a cafeteria, and other dining facilities.

Gladwin Hall. Housing the College of Nursing and allied health and biology laboratories, this building was named in honor of distinguished alumna Mary E. Gladwin (1887), who rendered unparalleled service as a war nurse. The \$10 million complex opened in 1979, adjacent to Knight Chemical Laboratory. The facility includes a multipurpose nursing laboratory, a simulated 13-bed hospital containing a surgical-labor delivery suite, a nursery suite, and a well-patient clinic.

Guzzetta Hall. Complementing the Edwin J. Thomas Performing Arts Hall, this facility was constructed directly across from Thomas Hall on Hill Street. The \$5.5 million structure dedicated in October 1976 houses the office of the dean of the College of Fine and Applied Arts, laboratory space for the School of Communication, and departmental space for the Schools of Theatre, Dance, and Music. In addition to providing more than 40 student practice rooms, the complex houses radio and television studios, WZIP-FM, a small experimental theatre, and a 300-seat recital hall.

James A. Rhodes Health and Physical Education Building (JAR). This structure on Buchtel Common is connected to Memorial Hall by a pedestrian bridge over South Union Street and contains an intercollegiate basketball facility seating 7,000, an indoor jogging track, physical education laboratories, classrooms, the athletic director's office, the sports information office, athletic offices, and a ticket office.



Hower House. Located on Fir Hill, the century-old mansion has been designated as a Historic Place by the National Park Service.

Knight Chemical Laboratory. This \$10 million complex is named in honor of Dr. Charles M. Knight, who taught the first courses in rubber chemistry in Buchtel College as early as 1909. Opened in 1979, the building features numerous innovative laboratories with the latest, most sophisticated safety equipment along with classrooms and faculty and administrative offices.

Kolbe Hall. Identified by its colonnade arch, this complex was named for the first president of the Municipal University of Akron, Parke R. Kolbe. It houses the University Theatre, and the Center for Community and Public Television, classrooms and interim office space for the Department of Civil Engineering (during the 1991/92 Auburn Science and Engineering Center Phase I Rehabilitation Project).

Leigh Hall. Named in honor of Warren W. Leigh, first dean of the College of Business Administration, the facility on Buchtel Common currently houses the John S. Knight Auditorium, and interim space for the Dean of Engineering, the Engineering Co-op office and Department of Mechanical Engineering offices (during the 1991/92 Auburn Science and Engineering Center Phase I Rehabilitation Project).

McDowell Law Center. Named for C. Blake McDowell, prominent local attorney, alumnus, and benefactor of the University, the center houses the School of Law. Opened in 1973 at a cost of \$2.5 million, it provides space for the 200,000-volume law library, classrooms, moot courtroom, appellate-review office, seminar rooms, and faculty offices. A \$2.8 million addition provides additional library and support space. The center stands at the corner of University Avenue and Wolf Ledges Parkway.

Memorial Hall. Dedicated to the memory of Summit County men and women who died in World War II, this is the companion building to the JAR. It contains offices of the Department of Health and Physical Education, a main gymnasium, a gymnastics area, a combatives area, a motor learning lab, a human performance lab, an athletic training for sports medicine lab, a weight training and fitness center, a swimming pool, the intramural sports office, and classrooms.

North Hall. Located on South Forge Street, this building will house, on a temporary basis, all faculty offices for the School of Communication and supplemental service space for the Police/Security Department.

Ocasek Natatorium. The six-million dollar natatorium, completed in 1988, is a 70,000 gross square foot structure that houses an Olympic-size swimming pool with adjacent spectator seating area, and locker rooms and showers. The center also houses nine racquetball courts as well as weight room facilities. The natatorium is named for former Ohio State Senator Oliver Ocasek.

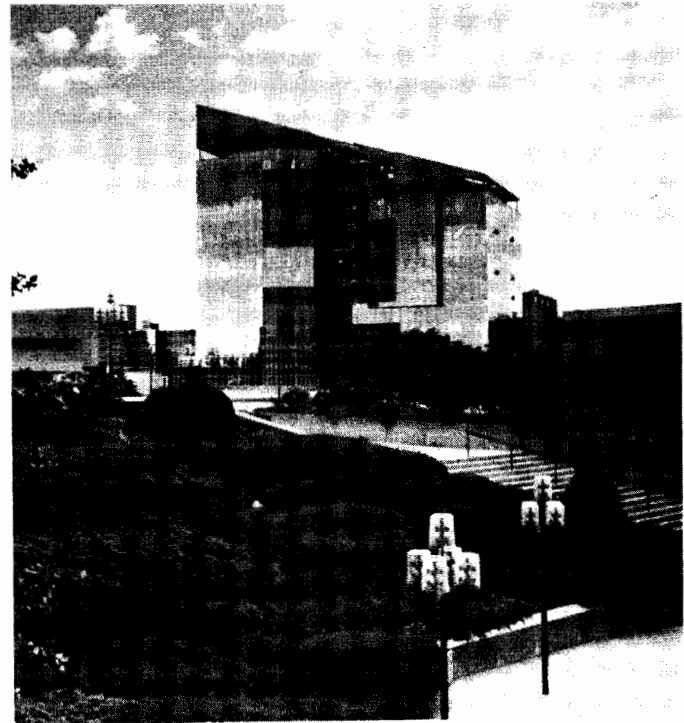
Olin Hall. Named in honor of Professor Oscar E. Olin and Mr. Charles Olin, this facility was completed in May 1975. The hall houses the dean of Buchtel College of Arts and Sciences and the following departments and institutes: classics, economics, English, general studies, history, modern languages, political science, philosophy, sociology, and English Language Institute. The complex is at the corner of Buchtel Common and South Union Street.

100 Lincoln Street Building (Industrial Incubator). Plans are currently underway to relocate the purchasing department to this building, at 100 Lincoln Street, by fall 1991.

143 Union Street Building (Newman Center). This recently purchased building, located at 143 South Union Street, provides administrative office space for the University auditor, budget director, the payroll department, and a portion of the Computer Center.

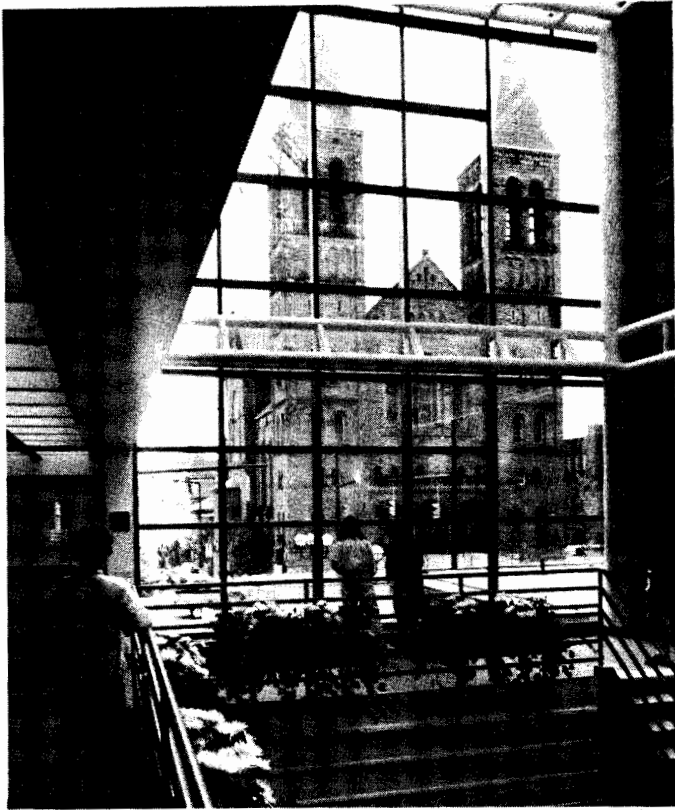
Olson Research Center. This remodeled warehouse on Forge Street houses the Department and Institute of Biomedical Engineering and the Department and Institute of Polymer Engineering.

Physical Facilities Operations Center. This building at 146 Hill Street is adjacent to E. J. Thomas Hall and houses physical facilities offices and craft shops, the central heating and cooling distribution center, and the Campus Police/Security Department.



Polymer Science Building. Construction of the new \$17 million polymer science building was completed in the spring of 1991. This two-tower structure of steel, concrete, and glass, located at 170 University Avenue, houses offices for the dean of the College of Polymer Science and Polymer Engineering and the American Chemical Society. The facility features a 200-seat lecture hall, offices, classrooms, and research laboratories for the Institute and Department of Polymer Science.

Robertson Dining Hall. This building, located at 248 East Buchtel Avenue, has a cafeteria and dining room for dormitory students, as well as the campus infirmary, which provides health services for the University.



Rubber Bowl. This off-campus stadium at 800 George Washington Boulevard, just four miles from the campus, features an artificial turf playing field, seating for 35,000, locker rooms, concessions, and a press box.

Schrank Hall. Named for Harry P. Schrank, long-time member and chairman of UA's Board of Trustees, this complex, which adjoins Auburn Science and Engineering Center, is composed of two academic structures and a parking deck. Schrank Hall North contains offices and classroom space. Schrank Hall South provides facilities for the School of Home Economics and Family Ecology, the divisions of Engineering and Science Technology and Associate Studies, and the Army and Air Force ROTC units.

Simmons Hall. Named for Hezzleton Simmons, University president from 1933 to 1951, this hall houses the University Counseling and Testing Center, the Department of Psychology, and Public Services Technology offices and laboratories. The Institute for Life-Span Development and Gerontology and the History of American Psychology Archives also occupy a portion of the building. A student interested in employment counseling and assistance will find the Office of Career Planning and Placement in this facility.

Spicer Hall. This major student contact building, renovated in 1975, houses the registrar's office, academic advising services, the Office of Student Financial Aid and Employment, University College, the Office of Cooperative Education, the parking systems office and offices for the University controller, accounts payable and receivable, and the state examiner.

The University Club of Akron. Located at 105 Fir Hill Street, The University Club has recently changed from a private club serving dues-paying members to a University-operated restaurant and banquet center. The table service restaurant is open for lunch between 11:30 a.m. and 2 p.m. Business and departmental functions, banquets, receptions, and parties can be scheduled during the hours of 7:30 a.m. to noon. The Office of Alumni Relations and the Department of Development as well as offices for the division of Institutional Advancement are located on the upper floors of the building.

277 Broadway Street Building (Blakemore-Rosen). This building was recently purchased to provide administrative space for the Vice President for Human Resources, academic and staff personnel, affirmative action, the benefits office, and the Department of University Communications.

West Hall. This renovated structure on Wolf Ledges Parkway next to the McDowell Law Center houses the School of Communicative Disorders and the outpatient Speech and Hearing Center as well as classrooms and law school offices.

Whitby Hall. Named for G. Stafford Whitby, a pioneer in the development of polymer science, this building was opened in fall 1975. Current plans indicate that chemical engineering and the chemistry department will share space in this facility.

Zook Hall. Named to honor George F. Zook, president of the University from 1925 to 1933, this Buchtel Common facility houses the College of Education and provides a lecture room that seats 260, general classrooms, a handicrafts room, a teaching demonstration classroom, a microteaching laboratory, an educational media lab, the Center for Economic Education, and the Student Teaching Office.

Computer Center

The **Computer Center** is at the west end of campus and provides computational support to those academic efforts of research and instruction where such support is feasible, and administrative data processing to assist in the conduct of the business of the University.

The center is equipped with an IBM 3090/200 Dyadic processor for academic and general administrative use. The academic community uses a loosely coupled IBM 4381-R14 and an IBM 3090-200. The IBM runs the VM-HPO operating system, and the IBM 3090-200 runs the MVS-XA operating system for both academic and administrative computing. A variety of peripheral equipment is attached to these computers including magnetic tape drives, disk drives, and remote terminals. A DEC VAX 11/785 is installed to aid research conducted in the computer science and engineering fields. The IBM 3090-200 has one Vector Processor for local supercomputer applications. The VAX, IBM 4381-R14, and the IBM 3090-200 have links to the Cray supercomputer located in Columbus, Ohio. A Scantron Mark Sense Reader creates computer-readable tapes from mark sense forms providing fast and reliable data entry for test scoring services and surveys.

The center also has widely used computer languages (e.g., FORTRAN C, COBOL, PL/1, BASIC, PASCAL, SAS, SPSS, APL, as well as some lesser known, e.g., WATFIV, ASSIST, SIMSCRIPT).

Plotting may be done using either a CalComp Drawingmaster or CalComp plotter. There is a variety of personal computers and terminal clusters that interact with the IBM-VM/CMS online system.

The Academic Systems Section assists the student and faculty member in making effective use of the Computer Center. It provides consultation and help in preparing usable computer programs and in analysis and solution of problems where the use of the computer is indicated. It will also acquire and install prepackaged programs for specific departments.

Student Services

COUNSELING AND TESTING

In addition to participating with the Career Planning and Placement Office and Cooperative Education Office in the Career Development Service, the Counseling and Testing Center, in Simmons Hall, provides a wide range of psychological counseling, therapy, testing, and outreach and consulting services to the University community.

Counseling Service

The center's counseling service offers assistance in the following areas:

- *Career counseling* involves discovering one's interests, needs, values, aptitudes, abilities, and goals; relating these to the world of work; exploring appropriate major subjects and career fields. Occupational information is available through reference books and two computerized vocational guidance and information systems, SIGI and OCIS.
- *Personal-emotional counseling* deals with feelings of loneliness, inadequacy, guilt, anxiety, and depression; harmful involvement with alcohol and drugs; interpersonal relationships, especially with the immediate family, dating partners, and roommates; personality development, identity, and self-esteem.
- *Educational counseling* relates to educational goals, motivation, attitudes, abilities and the development of effective study habits and skills.
- *Group educational programs* cover a wide range of topics which typically deal with improving grades, reducing test anxiety, planning careers, increasing wellness, and addressing personal issues; as well as providing support groups for minority students and others with a variety of concerns. Brochures are available.

Outreach and Consulting Service

The center's outreach and consulting service offers assistance to the larger university community by providing programs and workshops for a wide variety of campus groups. The center regularly provides speakers for classrooms, residence halls, student organizations, and administrative offices. Topic areas include academic performance, wellness, sexuality, and appreciating cultural diversity.

The center's staff is also available for consultation and advice in understanding individual or group behavior using psychological theory and principles. In addition, the center provides appropriate referral sources for social, psychological, and medical services.

Testing Service

The center's testing service offers a variety of testing programs such as the American College Test, the Admissions Testing Program of the College Entrance Examination Board, mathematics and foreign language placement test, Graduate Record Examination, Miller Analogies Test, Law School Admissions Test, and the College Level Examination Program (successful completion of CLEP tests can be substituted for certain course requirements of the University College).

Individual psychological and vocational testing is offered in conjunction with counseling. Tests cover such areas as vocational interests, aptitudes, achievement, personality, and assessment of learning disabilities.

STUDENT HEALTH SERVICES

Health service facilities are located in Robinson Dining Hall, immediately adjacent to the residence halls. First aid services and limited medical care are available in the health services.

The student who becomes seriously ill or suffers a serious injury on campus should be taken to an emergency ward of one of the local hospitals without delay. Those persons present in this kind of emergency should call Security or an ambulance immediately. The University assumes no legal responsibility or obligation for the expenses of such transportation or for medical services at the hospital.

The University constructs every facility with high safety standards and carries out this principle of maintaining physical security for its students by following stringent accident prevention measures. However, the University assumes no responsibility for student accidents incurred while attending or participating in classroom, gymnasium, or laboratory work.

Student health and accident insurance designed specifically for a student is required of all residence hall students and all international students except those who present proof of similar coverage. Other students may purchase this insurance at the annual individual rate. The student insurance provides coverage for such items as hospitalization, surgical benefits, and in-hospital medical benefits.

To identify existing or potential health problems, a *Health History Profile* form is included in the packet containing other admission forms and information. Explanations for completion and mailing of this form are included. Completion of this form is essential.

The completed health form and other health-related records are treated as confidential and are kept in the Student Health Services offices.

UNIVERSITY LIBRARIES

Library facilities are housed in three separate locations: in Bierce Library on Buchtel Common; the Science and Technology Department in Auburn Science and Engineering Center 104; and the Psychology Archives in Simmons Hall 10.

Library services include reference and research assistance, user education, bibliographic instruction, and computer-based information searching. Materials can be borrowed from the University libraries through the circulation department or obtained through interlibrary loan from other libraries. Archival Services collects and makes available materials which have historical or other research interest and which relate primarily to The University of Akron, to an eight-county region in Northeast Ohio, or to American psychology.

The University libraries' collections contain more than 2.8 million items: books, periodicals, government documents, curricular materials, microforms, maps, audio-visual materials, and archival documents. The library receives more than 6,000 magazines, journals, newspapers, and other serial publications, such as annual reports and the publications of various societies.

Through the library's memberships in the Center for Research Libraries, the Northeast Ohio Major Academic and Research Libraries consortium, the Online Computer Library Center (OCLC) and the Ohio Network of American History Research Centers, access to vast resources is greatly increased for University students, faculty, and staff.

University identification cards function as library cards. Photocopy services and equipment for use in making paper copies from microforms are available in the main library and the science and technology department. Group study rooms and typing facilities are also available in the main library.

Audio-Visual Services, located in Bierce Library 63B, maintains an extensive centralized collection of media hardware and audio-visual resources and materials for student and faculty use. It also has a collection of instructional materials in various media formats (filmstrips, slides, etc.) to supplement classroom instruction. Satellite stations for equipment distribution are located in Olin Hall 116; Schrank Hall South 238; Bierce Library 63; and Gardner Student Center on the second floor.

NURSERY CENTER

The University of Akron Nursery Center provides a variety of child development programs which are open to students, faculty, staff, and the general public. Each classroom is staffed with a Pre-K certified teacher and student aides. Opportunities are provided for youngsters to engage in developmentally appropriate activities in the following areas: creative art, language arts, music, science exploration, gross motor development, table and rug toys, socio-dramatic play, sandbox, water table, and computer. The program emphasizes the development of a positive self concept through an anti-bias curriculum.

The Nursery Center is open between 7:30 a.m. and 6 p.m. Monday through Friday during the fall and spring semesters offering hourly flextime and half day programs for children three to five years old. Full-day sessions are available for three to five year olds year around.

A summer program is also offered for school-aged children (K through third grade) from three to eleven years old during the center's summer hours, from 7:00 a.m. until 6 p.m. and a flextime program for three to five year olds.

For more information call the Nursery Center, 972-7760.

COURSE NUMBERING SYSTEM

Each course at the University has two numbers. One designates the college and department of which it is a part; one specifies the subject matter of the particular course. For instance:

3300:220 English Literature

In the above example, the first four digits of the number (3300) indicate the college and department. In this case, 3000 represents the Buchtel College of Arts and Sciences; 300 refers to the Department of English. The second set of digits (220) following the colon, indicates exactly which course in the Department of English is being specified. The course number also indicates the level at which the course is being taught and the point at which the student is ready to take the course.

An explanation of that numbering system follows:

100-199	First-year-level courses
200-299	Second-year-level courses
300-399	Third-year-level courses
400-499	Fourth-year-level courses
500-699	Master's-level courses
600-799	J.D.-level courses
700-899	Doctoral-level courses

When approved 400-level undergraduate courses are taken for graduate credit, they become 500-level courses. A student must apply for and be admitted to the Graduate School before registering for graduate credit.

Graduate School

Claibourne E. Griffin, Ph.D., *Interim Associate Vice President for Research and Graduate Studies*

Patricia L. Carrell, Ph.D., *Dean of the Graduate School*

Douglas V. Shaw, Ph.D., *Associate Dean of the Graduate School*

Lathardus Goggins, Ph.D., *Assistant Dean, Graduate School, Minority Recruitment*

OBJECTIVES

The purpose of the Graduate School is to provide a quality program of education by the following means:

- Advanced courses in various fields of knowledge beyond the baccalaureate level.
- Opportunities to develop and apply research techniques and to use the resources appropriate to various graduate programs.
- Advancement of student's knowledge for the benefit of mankind through the efforts of its faculty and students.

Nature of Graduate Education

The Graduate School provides a qualified student with education which may be required for the full development of scholarly and professional capacities, subject to the criteria developed by graduate departments.

Graduate education involves the extension of knowledge. However, it is by no means a mere continuation of undergraduate study. At its best, graduate education is characterized by an able and enthusiastic advanced student who joins faculty leaders to form a community of scholars dedicated to the common pursuit of truth. Critical analysis, independence of thought, originality of method, intensity of purpose, freedom from bias, thoroughness of inquiry, keenness of perception and vital creativity combine to produce in the successful student both the professional competence and the breadth of understanding essential to leadership in many areas of human endeavor.



History of the Graduate School

Graduate study began a few years after Buchtel College opened its doors, and the first earned master's degree was conferred in 1882. The College of Education awarded its first master's degree in 1924, the Colleges of Engineering and Business Administration in 1959, the College of Fine and Applied Arts in 1967 and the College of Nursing in 1979. The Department of Communicative Disorders (previously the Department of Speech), now housed in the College of Fine and Applied Arts, was formerly a part of the Buchtel College of Arts and Sciences and conferred a master's degree in 1963. The first earned doctoral degrees were conferred in 1959. Professor Charles Bulger was appointed first dean of graduate work in 1933, and he continued in that capacity until 1950. Professor Ernest H. Cherrington, Jr. served as director of graduate studies from 1955 to 1960 and as dean of the Graduate Division from its establishment in 1960 to 1967. Dr. Arthur K. Brintnall was appointed dean of Graduate Studies and Research in 1967, being succeeded in 1968 by Dr. Edwin L. Lively. Dr. Claibourne E. Griffin succeeded Dr. Lively in 1974 and served in that capacity until 1977. Dr. Joseph M. Walton, associate dean of Graduate Studies and Research, was administrative head of the Graduate School during the 1977-78 academic year. Dr. Alan N. Gent was appointed dean of Graduate Studies and Research in 1978 and served in that capacity until 1986. Dr. Joseph M. Walton served as acting dean of Graduate Studies and Research from 1986 until 1989. In 1989 Dr. Patricia L. Carrell became dean of the Graduate School.

The administrative functions of the Graduate School include establishment of suitable entrance requirements, admission of qualified students, maintenance of high-quality instruction and approval of graduation requirements for advanced degrees.

Graduate Programs

A qualified student who has completed the baccalaureate program with sufficiently high grades may continue studies through the University's Graduate School in a program leading to the master's degree as well as to the doctoral degree. An undergraduate student who qualifies may enroll in certain graduate-level classes and apply the credits earned to the total required for the baccalaureate degree. To receive graduate credit for the courses, however, the student must first be admitted to the Graduate School.

The Graduate School offers programs of advanced study leading to the degree of Doctor of Philosophy in chemistry, history, polymer science, psychology, sociology, urban studies, education (elementary, secondary and guidance and counseling) and engineering. The Doctor of Education degree is offered in educational administration. The Doctor of Philosophy program in sociology is a joint program with Kent State University. The Doctor of Philosophy program in urban studies is a joint program with Cleveland State University.

The school also offers programs of study leading to the master's degree with majors in the following areas: accounting, biology, business administration (accounting, finance, international business, management, marketing and taxation), chemical engineering, chemistry, civil engineering, communicative disorders, earth science, economics, education (educational foundations, elementary, secondary, multicultural education, physical education, elementary or secondary school principal, school supervisor, local superintendent, counseling,



special education, visiting teacher, reading specialist and school psychology), electrical engineering, engineering, English, French, geography, history, home economics and family ecology, management, communication, mathematics, mechanical engineering, music, nursing, philosophy, physics, political science, polymer engineering, polymer science, psychology, public administration, sociology, Spanish, speech, statistics, technical education, theatre arts and urban studies. In addition, the College of Education provides a year of study beyond the master's degree in the area of school superintendent.

Several departments offer a limited amount of work which may be taken on the graduate level. Such courses may supplement the major program of study for students who do not wish to devote their entire attention to one field.

Graduate Faculty and the Graduate Council*

The graduate faculty is comprised of those members of the faculty who hold appointments at the rank of assistant professor or above and teach graduate courses, supervise theses and dissertations and are generally responsible for the graduate program at the University. They are appointed by the dean of the Graduate School after recommendation by the department, college dean and Graduate Council. Guidelines for recommendation and appointment include the following:

- Quality and experience in upper-level and graduate-level teaching.
- Possession of terminal degree in field.
- Scholarly publication record.
- Activity in research.
- Activity in profession or discipline.



The purpose of the graduate faculty is to encourage and contribute to the advancement of knowledge through instruction and research of highest quality, and to foster a spirit of inquiry and a high value on scholarship throughout the University.

The graduate faculty recommends a student who has been nominated by the student's college faculty for the appropriate master's or doctoral degree.

Graduate Council is elected by the graduate faculty. Membership in the council presently includes two members from the College of Engineering, two members from the College of Business Administration, two members from the College of Education, four members from the Buchtel College of Arts and Sciences, two members from the College of Fine and Applied Arts, one member from the College of Nursing, one member from the College of Polymer Science and Polymer Engineering, and one student member elected yearly by the Graduate Student Council. Members serve three-year terms and may not succeed themselves. The dean of the Graduate School serves as chair of both the graduate faculty and the Graduate Council.

The functions of the council include examination of proposed graduate programs and course offerings, recommendation of policy for all phases of graduate education, recommendation of persons for membership in the graduate faculty and advising and counseling the dean in administrative matters.

Graduate Student Government

All registered graduate students at the University are constituents of the Graduate Student Government (GSG). The government council consists of elected representatives from each of the graduate departments, an executive board of officers, and a faculty adviser.

The objectives of GSG are to govern graduate student affairs, represent graduate student sentiment and promote interdepartmental social exchange and interaction between students. These objectives are met by appointing members to participate in various administrative committee meetings, such as University Council, Graduate Council and Board of Trustees meetings. GSG also sponsors numerous social events, such as faculty-student mixers and an annual dinner dance.

GSG maintains an office on the lower level of Gardner Student Center (phone 972-6123). Anyone wishing more information or anyone who wants to air a complaint, problem or suggestion concerning graduate students may contact the office or attend the bimonthly GSG meetings, where all graduate students are welcome.

*An exclusive listing of graduate faculty and Graduate Council can be found in the "Directory" of the *Graduate Bulletin*.

SECTION **Two**

General information



General Information

REGULATIONS

Student Responsibility

A student assumes full responsibility for knowing the regulations and pertinent procedures of the Graduate School as set forth in this *Bulletin*. Normally, the degree requirements in effect at the time a student is admitted to a program will apply through graduation. However, if existing programs are revised, the student has the option of pursuing the revised program as long as *all* requirements in the revised program are met. Additional information pertaining to programs can be obtained from the appropriate department head.

Admission

Every person who desires to enroll in or audit any graduate credit course must be first admitted or approved by the Graduate School.

Applications for admission to the Graduate School should be submitted to the dean of the Graduate School at least six weeks before the start of the term for which admission is sought in order to allow adequate time for complete processing. No applications will be accepted after the University deadline for applications, which is usually about three weeks before the beginning of a term and is published in the Schedule of Classes. Some programs, such as nursing, school psychologist and counseling psychology, have earlier deadlines. Applicants should contact the departments for more detailed application information.

Each application must be accompanied by an application fee of \$25. Applicants who have previously paid the application fee need not pay it again. The fee is not refundable under any circumstances. Payment should be made by check or money order to The University of Akron.

An official transcript from *each* college or university attended must also be received by the Graduate School before the application will be processed. This applies to the complete academic record, both undergraduate and graduate. Transcripts should be sent from the institutions attended directly to the Graduate School. The applicant is responsible for seeing that the above conditions are met by the deadlines for filing applications.

All records, including academic records from other institutions, become part of the official file and cannot be returned for any purpose. An offer of admission will normally be made to an applicant who meets all admission requirements. However, it must be recognized that staff, facilities and other resources are limited, so the number of students accepted will vary among departments and from term to term. An accepted applicant may begin graduate work in the fall, spring or summer semester. The offer of admission is void, however, if the applicant does not register for courses within two years from the time of admission. An individual whose offer of admission has lapsed must submit a new application to be reconsidered.

The student is admitted only for the purpose or objective stated on the application for admission. A new request for admission must be filed when the original objective has been attained or when the student wishes to change objectives. The admitted status terminates when the time limits have been exceeded or other conditions for continued admitted status have not been met.

No student will be admitted without approval and acceptance by a department within the University, but admission to a department does not necessarily imply admission to or candidacy for any graduate degree program in that department. Admission for graduate study in any program can only be granted by the dean of the Graduate School.

Classification

All students are identified by the Graduate School as being in one of the following categories. Any change must be arranged through the Graduate School.

- *Full Admission* may be given to any applicant who desires to pursue a graduate degree and has a baccalaureate degree from an accredited college or university with an overall grade-point average of 2.75 or better or 3.00 for the last two years (64 semester credits or equivalent); or holds an advanced degree from an accredited college or university in or appropriate to the intended field; or holds a baccalaureate or master's degree from a foreign college or university with first-class standing or its equivalent, plus satisfactory evidence of competence in English. Full admission may also be granted to applicants to the College of Business Administration who meet the college's admission requirements.



- *Provisional Admission* may be granted to a person who has not met all of the requirements for *full admission*. This admission status permits a student to take up to 15 semester credits of graduate coursework. Graduate courses taken under this admission status may be applied to a graduate degree program, but only when all requirements for *full admission* have been met.
- *Deferred Admission* may be granted if the applicant's record does not meet *provisional admission* standards. After completion of a postbaccalaureate program of study with an appropriate GPA, as prescribed by the department (usually two to five courses), the student may be reconsidered for *provisional admission* to the Graduate School. No graduate-level coursework can be taken by a student under the *deferred admission* status.
- *Non-Degree Admission* may be granted to a person who wishes to take particular courses but who is not working toward a graduate degree. This admission status permits a student to take up to 15 semester credits of graduate coursework. Graduate courses taken under this admission status may be applied later to a graduate degree program, but only when all requirements for *full admission* have been met.
- *Special Workshop* status is for a person permitted to take workshops for graduate credit *without being admitted to Graduate School*. Such permission is granted by the workshop director upon receipt of a signed statement of possession of a baccalaureate degree by the applicant, and terminates upon completion of this workshop. A student admitted to special workshop status must apply through regular channels for any other category. A maximum of six workshop credits may be applied to degree work at a later date if the applicant is given *full admission* to the Graduate School.
- *Transient* status may be given to a person who is a regularly enrolled graduate student in good standing in a degree program at another accredited university and has written permission to enroll at The University of Akron. Such permission is valid only for the courses and semester specified, with a maximum of 10 semester credits allowable, and is subject to the approval of the instructor, department head and Graduate School. A transient student is subject to the same rules and regulations as a regularly enrolled student of the University.
- *Undergraduate* status is for an undergraduate student at the University who may be granted permission to take one or more graduate-level courses if all the following conditions are met:
 - senior standing;
 - overall grade-point average of 2.75 or better through preceding term (if a student does not have a 3.00 or better in the major field, special justification will be required);
 - written approval is given by the instructor of the course and the student's adviser.

These courses may later be applied to a degree program if not used to satisfy baccalaureate degree requirements. The maximum number of graduate credits that may be taken by an undergraduate and applied later toward a graduate degree is 12.

• *Postdoctoral status is divided into three categories:*

- a *Fellow* is a person holding an earned doctorate who is engaged in advanced research. A fellow shall be considered a guest of the University and provided space and use of facilities within limits of practical need of the undergraduate and graduate programs. Tuition and fees shall be collected if allowed under sponsoring contract for any courses the fellow may choose to take;
- a *Special* is a person holding an earned doctorate who desires an additional graduate degree. A special may be admitted to any program upon submission of application forms, application fee (if new student) and an official transcript from the institution awarding the doctorate. This student will be treated as a regular student subject to registration fees and program degree requirements;
- a *Guest* is a person holding an earned doctorate who desires to attend courses and seminars relevant to individual work or interests without registering or receiving grades. A written application should be submitted to the dean of the Graduate School for each course to be taken, and approval of the instructor, department head and college dean shall be obtained. A guest is welcome to any course or seminar provided space is available. Normally, space and facilities for research cannot be provided for a postdoctoral guest but special requests will be considered. Requests should be submitted, in writing, to the dean of the Graduate School who will review such requests with the appropriate college dean and department head.

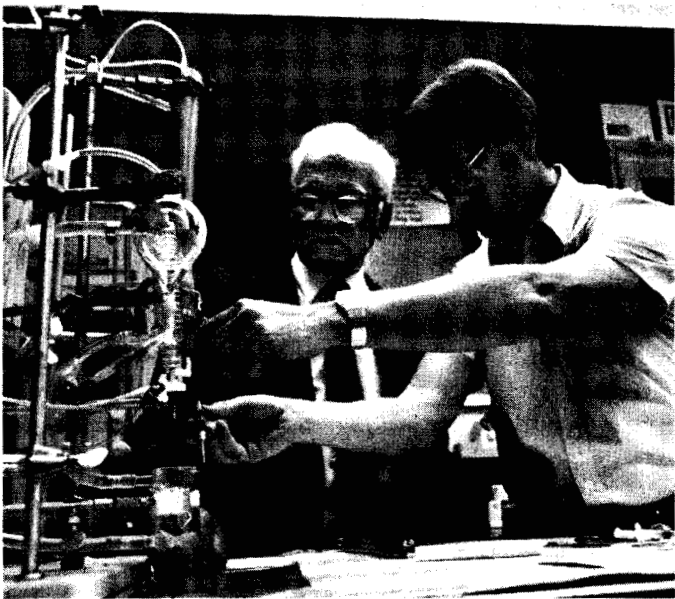
International Students

International students are normally admitted for the fall semester. All credentials must be received by the previous April 1. Applicants seeking financial aid should submit all credentials by the previous January 1. International students should not plan to leave home until they have received both admission to a graduate program and the appropriate immigration materials from the Office of International Student and Scholar Services.

The first obligation of The University of Akron is to residents of the state of Ohio. Therefore only the most qualified international students can be admitted.

Graduate students will need approximately \$6,264 for tuition and fees and \$11,000 for living expenses for 12 months.

Applicants whose native language is not English are required to demonstrate high-level competence in the use of the English language, including reading, writing, speaking and listening, prior to admission. This competence is established by achieving a score of at least 550 on the TOEFL (the Test of English as a Foreign Language). The TOEFL is administered by Educational Testing Service, Box 899, Princeton, NJ 08540, USA. Applicants should make arrangements to take the test as soon as study at The University of Akron is anticipated and should request ETS to forward the official test score directly to the Graduate School, The University of Akron, Akron, OH 44325. The official score should be received in the Graduate School by June 1 for fall admission. Unofficial copies of the TOEFL cannot be accepted. If the TOEFL is not available, the applicant should contact the international student adviser at The University of Akron for other arrangements. Personal letters certifying English competence are not acceptable as substitutes for test scores.



The completion of an English placement test after admittance will also be required. Based on the results of this test, a student may be required to take an English language course for credit.

An international student, coming to The University of Akron in good standing after one full year of work at an accredited American college or university, may have the English proficiency requirement waived upon written request.

Following the recommendation of the American College Health Association and the National Association for Foreign Student Affairs, The University of Akron requires all international students and exchange visitors (individuals on J and F visas) to carry medical insurance. Such health insurance coverage must be in effect during their stay in the United States. It must also include coverage for repatriation and medical evacuation should a student need to be sent home for medical reasons. *International students will not be permitted to register without proof of such coverage.*

Teaching Assistants

Applicants whose native language is not English, who expect to become *teaching assistants*, are also required to achieve a minimum score of 220 on the Test of Spoken English (TSE) prior to functioning as teaching assistants. Those for whom English is the native language and who expect to function as *teaching assistants* must demonstrate proficiency in English through departmental certification. Neither the TSE nor departmental certification is required for *research* or *administrative assistants*.



Nonaccredited American School Graduates

A student holding a baccalaureate degree from a non-accredited American college or university, if otherwise qualified, is normally required to complete at least 10 semester credits of postbaccalaureate work at a 3.00 level before being considered for admission to the Graduate School. The accreditation status of the school at the time of the student's graduation shall apply. A student should consult with the department head in the major field to develop a postbaccalaureate program.

Grades

A student admitted to graduate study under any status at the University is expected to maintain a minimum 3.00 grade-point average (4.00="A") at all times. A minimum grade-point average of 3.00 is required for graduation. No more than six semester credits of "C+," "C," and "C-" grades may be counted toward the degree. Grades of "D+," "D," and "D-" are treated as "F" grades. No grades below "C-" may be counted toward a degree.

Official academic records for graduate students are maintained with a grade-point system as follows:

Grade	Quality Points	Key
A	4.0	
A-	3.7	
B+	3.3	
B	3.0	
B-	2.7	
C+	2.3	
C	2.0	
C-	1.7	
D+	0.0	
D	0.0	
D-	0.0	
F	0.0	Failure
CR	0.0	Credit
NC	0.0	No credit
AUD	0.0	Audit

The following grades may also appear on the term grade reports or on the official academic record. There are no grade points associated with these grades.

I — Incomplete: Indicates that the student has done passing work in the course but that some part of the work is, for good and acceptable reason, not complete at the end of the term. Failure to make up the omitted work satisfactorily by the end of the following term, not including summer sessions, converts the "I" to an "F." When the work is satisfactorily completed within the allotted time the "I" is converted to whatever grade the student has earned.

IP — In Progress: Indicates that the student has not completed the scheduled course work during the term because the nature of the course does not permit completion within a single term, such as work toward a thesis.

PI — Permanent Incomplete: Indicates that the student's instructor and the instructor's dean have for special reason authorized the change of an incomplete ("I") or an in progress ("IP") to a permanent incomplete ("PI").

W — Withdraw: Indicates that the student registered for the course but withdrew officially sometime after the second week of the term.

NGR — No Grade Reported: Indicates that, at the time grades were processed for the present issue of the record, no grade had been reported by the instructor.

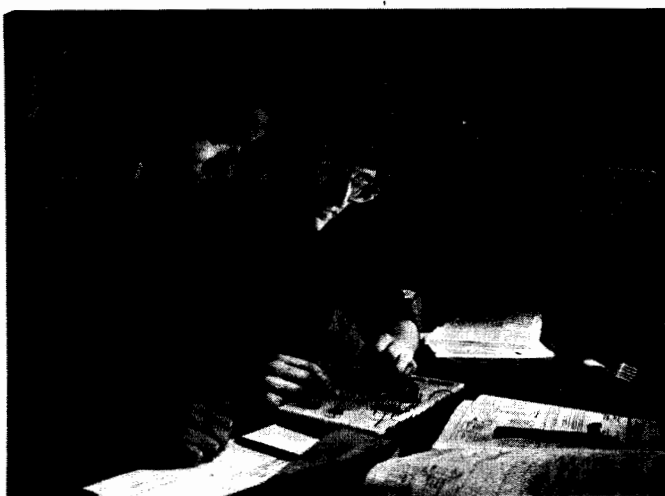
INV — Invalid: Indicates the grade reported by the instructor for the course was improperly noted and thus unacceptable for proper processing.

Probation and Dismissal

Any student whose grade-point average falls below 3.00 is no longer in good standing and will be placed on probation. In consultation with the college or department, as appropriate, the dean of the Graduate School will dismiss full-time students who do not return to good academic standing within two consecutive semesters (excluding summers) and part-time students who do not return to good academic standing within the attempting of 15 additional credits.

For the purpose of administration of the full-time and part-time provisions of this policy, full-time and part-time status are determined by the semester in which the student goes on probation. Full-time enrollment constitutes nine or more graduate credits; part-time is less than nine graduate credits.

*If instructors wish to extend the "I" grade beyond the following term for which the student is registered, prior to the end of the term they must notify the Office of the Registrar in writing of the extension and indicate the date of its termination. It is the responsibility of the student to make arrangements to make up the incomplete work. The faculty member should submit the new grade to the Office of the Registrar in writing.



The dean of the Graduate School, with the approval of the relevant department head, may also dismiss anyone who fails to make satisfactory progress toward declared goals or who accumulates six semester credits of "C+" or below. The accumulation of six semester credits of "F" will result in mandatory dismissal.

A student dismissed from the Graduate School for academic reasons may not be readmitted for one calendar year, and then only if evidence for expecting satisfactory performance is submitted and found acceptable.

Repeating Courses

Any graduate course may be repeated once for credit. However, the degree requirements shall be increased by the credit hour value of each course repeated. The hours and grades of both the original and the repeated section shall be used in computing the grade-point average. Required courses in which a "D" or "F" was received must be repeated.

Transfer Students

A graduate student matriculated in the Graduate School of another college or university who wishes to transfer to The University of Akron to continue graduate education must be in good standing at the other school.

Course Load

A full load of coursework at the graduate level is normally 9-15 semester credits including audit. Full-time status is defined as a minimum of 9 semester credits.

Colloquia, Seminars and Workshops

Colloquium (credit/noncredit grading)

A course that normally involves guests, faculty or graduate students as speakers. The intent of the course is to introduce a broad range of topics using resource personnel. Normally, assignments are limited to class participation.

Seminar (letter grades)

A course that normally involves group discussion or other activities based on assigned material. Grades are awarded based on a combination of assignments, tests and class participation.

Workshop (credit/noncredit grading)

A course that normally operates over a shorter period than a semester or a summer session. Workshops focus on a particular aspect or aspects of a field of study, require a combination of assignments, tests and class participation, and may or may not be permitted to satisfy degree requirements.

Registration

The responsibility for being properly registered lies with the student, who should consult with the assigned adviser in preparing a program of courses and/or research. A schedule of courses, hours, class location and registration procedures is obtainable from the registrar.

Entrance Qualifying Examinations

The use of examinations to determine admissibility to enter a graduate program or eligibility to continue in one is the prerogative of the departments offering graduate programs. The department has the right to select the examination and minimum acceptable level of performance. Information and procedure may be obtained from the head of the appropriate department.

Fees

All fees reflect charges in 1991-92 and are subject to change without notice.

Application Fee

This fee is not refundable under any circumstances \$25

Tuition Fees

Resident student per credit \$110.80
Nonresident student per credit \$201.80
(auditors pay same fees)

General Fee

1-12 credits per semester \$9.13 per credit
13 credits and over per semester \$118.00 per semester

Parking Permit Fee

5 or more credits per semester \$50
4½ or fewer credits per semester \$30
One summer session \$17.75
Workshop participants \$2 per day up to \$16

Graduation Fees

Each degree (except law) \$30

Other Fees

Thesis and binding (payable at time of application for degree) binding per volume	\$9.50
Microfilming (Ph.D. only) (payable at time of application for degree)	\$60.00
Copyright Fee (payable at time of application for degree if copyright is sought)	\$25
Course schedule change fee (for each schedule change form processed)	\$5
Transcripts (if more than one transcript of a student's academic record is ordered by a student at one time, the fee shall be \$4 for the first transcript and \$2 for each additional one.)	\$4
Late Graduation Application Fee	\$10
Late Registration Fee	\$25

• **Course Materials and Computing Fees:**

For the following undergraduate courses, the fee noted will be assessed to cover the cost of instructional materials distributed by the instructor and computing fees:

Course Number	Course Title	Credits	Course Fee
Buchtel College of Arts and Sciences			
3100:522	Conservation of Biological Resources	4	\$15
3100:524	Freshwater Ecology	3	\$15
3100:526	Applied Aquatic Ecology	3	\$15
3100:533	Pathogenic Bacteriology	4	\$15
3100:535	Virology	4	\$20
3100:537	Immunology	4	\$15
3100:540	Mycology	4	\$15
3100:541	Plant Development	4	\$15
3100:542	Plant Anatomy	3	\$15
3100:543	Phycology	4	\$15
3100:545	Plant Morphology	4	\$15
3100:547	Plant Physiology	3	\$15
3100:551	General Entomology	4	\$10
3100:553	Invertebrate Zoology	4	\$10
3100:554	Parasitology	4	\$10
3100:558	Vertebrate Zoology	4	\$15
3100:561	Human Physiology	4	\$15
3100:562	Human Physiology	4	\$15
3100:564	General and Comparative Physiology	4	\$15
3100:566	Developmental Anatomy	4	\$15
3100:567	Developmental Anatomy	4	\$15
3100:580	Radiation Biology	3	\$15
3150:505	Biochemistry Laboratory	2	\$25
3150:511	Physical Chemistry for Biology Majors	3	\$25
3150:521	Qualitative Organic Analysis	4	\$25
3350:505	Geographic Information Systems	3	\$ 5
3350:536	Urban Land Use Analysis	3	\$ 5
3350:542	Thematic Cartography	3	\$ 5
3350:544	Map Compilation and Reproduction	3	\$ 5
3350:547	Introduction to Remote Sensing	3	\$ 5
3350:548	Automated Computer Mapping	3	\$ 5
3350:549	Advanced Remote Sensing	3	\$ 5
3350:595	Soil and Water Field Studies	3	\$ 5
3370:510	Regional Geology of North America	3	\$10
3370:511	Glacial Geology	3	\$15
3370:521	Coastal Geology	3	\$10
3370:525	Advanced Stratigraphy	3	\$15
3370:532	Optical and X-Ray Methods	3	\$15
3370:533	Petrography	3	\$15
3370:535	Petroleum Geology	3	\$15
3370:536	Coal Geology	3	\$15
3370:537	Economic Geology	3	\$15
3370:546	Exploration Geophysics	3	\$15
3370:550	Advanced Structural Geology	3	\$15
3370:563	Micropaleontology	3	\$15
3370:570	Geochemistry	3	\$15
3370:574	Groundwater Hydrology	3	\$15
3450:527	Introduction to Numerical Analysis	3	\$15
3450:528	Numerical Linear Algebra	3	\$ 5
3450:529	Numerical Solutions: Ordinary Differential Equations	3	\$ 5
3450:635	Optimization	3	\$ 5
3460:518	Introduction to Discrete Structures	3	\$10
3460:520	Structured Programming	3	\$10
3460:526	Operating Systems	3	\$10
3460:528	UNIX System Programming	3	\$10
3460:530	Theory Programming Languages	3	\$10
3460:535	Analysis of Algorithms	3	\$10
3460:540	Compiler Design	3	\$10
3460:555	Data Communications and Networks	3	\$10
3460:557	Computer Graphics	3	\$10
3460:560	Artificial Intelligence and Heuristic Programming	3	\$10
3460:565	Computer Organization	3	\$10
3460:575	Data-Base Management	3	\$10
3460:610	Symbolic and Numeric Methods	3	\$10
3470:580	Statistical Computer Applications	3	\$ 5
3470:667	Factor Analysis	3	\$10
3470:668	Multivariate Statistical Methods	3	\$ 5
3650:551	Advanced Laboratory I	2	\$25
3650:552	Advanced Laboratory II	2	\$25
3700:542	Methods of Policy Analysis	3	\$10
3980:600	Basic Quantitative Research	3	\$10
3980:601	Advanced Research and Statistical Methods	3	\$10

College of Engineering

All graduate-level courses in the College of Engineering are assessed a \$5 fee with the exception of the following courses:

4200:566	Digitized Data and Simulation	3	\$60
4400:555	Microwaves	4	\$60
4400:565	Computer Circuits	4	\$40
4400:572	Control Systems II	4	\$40
4800:601	Biomedical Instruction I	4	\$50
4800:620	Neural Networks	3	\$40
4800:634	Medical Imaging Devices	3	\$50
4800:640	Spine Mechanics	3	\$40
4800:641	Soft Connecting Tissue Biochemistry	3	\$40
4800:642	Hard Connecting Tissue Biochemistry	3	\$40

College of Education

5100:512	Design and Production of Institutional Material	3	\$10
5100:520	Introduction to Computer-Based Education	3	\$10
5100:630	Seminar in Computer-Based Education	3	\$10
5300:525	Advanced Micro Application in Secondary Schools	3	\$10
5600:671	Counseling Clinic	1-3	\$10
5610:570	Clinical Practicum in Special Education	3	\$10
5620:611	Practicum in School Psychology	4	\$10
5700:615	Computer Application in Education Administration	2	\$10

College of Business Administration

All graduate-level courses in the College of Business Administration are assessed a \$5 fee.

College of Fine and Applied Arts

7100:591	Architectural Presentations I	3	\$ 5
7100:592	Architectural Presentations II	3	\$ 5
7400:503	Advanced Food Preparation	3	\$15
7400:519	History of Furniture and Interiors II	3	\$ 5
7400:520	Experimental Foods	3	\$15
7400:532	Interiors, Textiles, and Product Analysis	3	\$10
7400:533	Interior Design I - Residential	3	\$15
7400:534	Commercial Design	3	\$15
7400:535	Principles and Practices of Interior Design	3	\$10
7400:536	Textile Conservation	3	\$ 5
7600:588	Advanced Film Production	3	\$20
7600:589	Documentary Form in Film and Television	3	\$15
7700:641	Amplification	3	\$10
7700:650	Advanced Clinical Practicum: Differential Diagnosis	1	\$10
7700:651	Advanced Clinical Practicum: Voice	1	\$10
7700:652	Advanced Clinical Practicum: Fluency	1	\$10
7700:654	Advanced Clinical Practicum: Diagnostic Audiology	1	\$10
7700:655	Advanced Clinical Practicum: Articulation	1	\$10
7700:656	Advanced Clinical Practicum: Language	1	\$10
7700:657	Advanced Clinical Practicum: Rehabilitation Audiology	1	\$10

College of Nursing

8200:622	Family Nursing I	4	\$25
8200:625	Teaching Strategies in Nursing Education	3	\$25
8200:629	Financial Management for Nursing Administration	3	\$25

Refunds

Registration does not automatically carry with it the right of a refund or reduction of indebtedness in cases of failure or inability to attend class or in cases of withdrawal. The student assumes the risk of all changes in business or personal affairs.

Fees Subject to Refund

- Instructional and nonresident surcharge.
- General fee.
- Parking (only if permit is returned).
- Student teaching.
- Laboratory breakage and late service deposit.

Amount of Refund

Amount of refund is to be determined in accordance with the following regulations:

- In full
 - if the University cancels the course;
 - if the University does not permit the student to enroll or continue;
 - if the student dies before or during the term or is drafted into military service by the United States; or if the student enlisted in the National Guard or Reserves prior to the beginning of the term called to active duty, presents notice of induction or orders to active duty. A student who enlists voluntarily for active duty should see "in part" below.
- In part
 - less \$5 per enrolled credit to a maximum of \$50 if the student requests in writing to the dean or designated official withdrawal from all credit courses on or before the second day of the term.



Commencement

Students earning graduate degrees are expected to participate in the commencement exercises. A degree candidate who has legitimate reasons for graduating "In Absentia" should make a written request to the registrar within the established dates and pay the designated fee.

Students must apply to graduate in advance of completing degree requirements. Applications are filed with the Graduation Office which observes the following deadlines:

Spring graduation: September 15
Fall graduation: May 15

Financial Assistance

The University awards a number of graduate assistantships to qualified students. Assistantships are normally awarded for up to two years of master's study and up to four years of doctoral degree study. These assistantships provide stipends of \$5,800 to \$9,000 plus remission of tuition and fees and are available in all departments with graduate degree programs. A graduate assistant renders service to the University through teaching, research and other duties. For information and/or applications, contact the head of the department. Tuition scholarships are also available on a limited basis in some departments.

A number of fellowships sponsored by industry and government agencies are available in some departments. Stipends range up to \$13,000. For information, contact the head of the department.

Information about student loans can be obtained from the Office of Student Financial Aid.

Additional information concerning financial aid policies is available in the Graduate Assistant Handbook which can be obtained from the Graduate School.

— if the student requests in writing to the dean or designated official withdrawal after the second day of the fall or spring semesters, the following refund percentages apply:

3 through 12 calendar days*	70%
13 through 24 calendar days*	50%
25 through 33 calendar days*	30%
Thereafter	0%

— if the student requests in writing to the dean or designated official withdrawal after the second day of any summer session the following refund percentages apply:

3 through 7 calendar days*	60%
8 through 15 calendar days*	40%
Thereafter	0%

- Refunds for course sections which have not been scheduled consistent with either the standard 15-week fall/spring semester or the five-week summer term scheduling pattern will be handled on a pro rata basis according to the number of days the section (class, institute or workshop) has been attended compared to the number of days said section has been scheduled to meet.
- Refunds will be determined as of the date of official withdrawal unless proof is submitted that circumstances beyond control of the student prevented the filing of the withdrawal earlier, in which case the refund will be determined as of the last day of attendance. The student assumes responsibility for filing for a refund.
- Refunds will be mailed as soon as possible. Refund checks are subject to deduction for any amount owed to The University of Akron by the student.
- No refund will be granted to a student dismissed or suspended for disciplinary reasons.



*If the 7th, 12th, 15th, 24th, or 33rd day falls on Friday, Saturday or a holiday, the deadline will become the next business day.

SECTION

Three

Academic requirements



EikonGraphics

Academic Requirements

MASTER'S DEGREE REQUIREMENTS

Admission

When a student is admitted to graduate study, an adviser is appointed by the head of the major department. A student who is academically qualified in general but deficient in course preparation may be required to make up the deficiencies at the postbaccalaureate level. This may be recommended prior to beginning graduate work, or in some cases, can be done simultaneously.

Residence Requirements

There are no formal residence requirements for the master's degree. A student may meet the degree requirements of the Graduate School and the department through either full- or part-time study.

Time Limit

All requirements must be completed within six years after beginning graduate-level coursework at The University of Akron or elsewhere. Extension by up to one year may be granted in unusual circumstances by the dean of the Graduate School upon written request by the student and recommendation by the adviser and department head.

Credits

A minimum of 30 semester credits of graduate work is required in all master's degree programs. This includes thesis credit. Some departments require more (see departmental requirements). A minimum of two-thirds of the total graduate credits required in any master's program must be completed at the University. A maximum of six workshop credits may be applied to a master's degree. Such credits must be relevant to the degree program, recommended by the student's adviser and approved by the dean of the Graduate School.

It should be noted that the requirements listed by department elsewhere in this section refer to the minimum necessary for a degree. It is entirely within the prerogative of the department to assign additional credits of coursework or other requirements in the interest of graduating a fully qualified student.

No graduate credit may be received for courses taken by examination or for 500-numbered courses previously taken at the 400-number course level as an undergraduate without advance approval from the dean of the Graduate School.

Transfer

Up to one-third of the total graduate credits required may be transferred from an accredited college or university. All transfer credit must be at the "A" or "B" level in graduate courses. The credits must be relevant to the student's program and fall within the six-year time limit. A University of Akron student must receive prior approval for transfer courses taken elsewhere.

A student seeking to transfer credits must have full admission and be in good standing at The University of Akron and the school in which the credits were achieved. Transfer credit shall not be recorded until a student has completed 12 semester credits at The University of Akron with a grade-point average of 3.00 or better.

Optional Department Requirements

Each department may set special requirements with regard to entrance examinations, qualifying examinations, foreign language, required courses and thesis. Details are available from the head of the major department.

Advancement to Candidacy

A student should apply for advancement to candidacy after completion of one-half of the credits required for the degree in his or her program. A student must be fully admitted and in good standing to be advanced to candidacy.

Advancement to Candidacy forms must be submitted no later than May 15 for the January commencement and no later than September 15 for the May commencement. These forms are available in the office of the Dean of the Graduate School or in the academic department.

Graduation

To be cleared for graduation, a candidate must have completed coursework with a minimum average of 3.00; been advanced to candidacy; filed an application for graduation with the registrar; paid all applicable fees; and met any other department and University requirements applicable.

If a thesis is required, two copies, properly prepared, are due in the Graduate School at least three weeks prior to commencement. These copies must be signed by the adviser, faculty reader, department head and college dean prior to submission to the dean of the Graduate School. A manual entitled *Preparing a Thesis or Dissertation* is available in the Graduate School and all copies of the thesis must conform to these instructions.

DOCTORAL DEGREE REQUIREMENTS*

A master's degree is not a prerequisite for the doctorate; however, the first year of study after the baccalaureate will be substantially the same for both the master's and doctoral student. Some programs admit students to doctoral programs directly after the bachelor's degree; others require a master's degree. No specific number or sequence of courses constitutes a doctoral program or assures attainment of the degree. A formal degree program consists of a combination of courses, seminars and individual study and research that meet the minimum requirements of the Graduate School and those of the committee for each individual student.

Admission

Usually, a student is not officially considered as a doctoral student until completion of a master's program or its equivalent and approval for further study. Departments offering doctoral degree programs review each candidate carefully before recommending admission.

A minimum grade-point average of 3.00 is required for graduation of a candidate for all doctoral degrees.

Residence Requirements

A doctoral student may meet the degree requirements of the Graduate School and department by full-time study or a combination of full- and part-time study.

The minimum residence requirement for a doctoral candidate in all programs is at least two consecutive semesters of full-time study and involvement in departmental activities. Full-time study is defined as 9-15 semester credits, except for graduate teaching and research assistants for whom full-time study is specified by the assistantship agreements. The summer sessions may count as one semester, provided that the candidate is enrolled for a minimum of 10 consecutive weeks of full-time study and for a minimum of six semester credits per five-week session. Individual programs may have additional residence requirements such as credits or courses to be completed, proper time to fulfill the residence requirement, and the extent to which a resident may hold outside employment.

Before a doctoral student begins residency, the student's adviser and the student shall prepare a statement indicating the manner in which the residence requirement will be met. Any special conditions must be detailed and will require the approval of the student's committee, the department faculty members approved to direct doctoral dissertations, the collegiate dean and the dean of the Graduate School.

Time Limit

All doctoral requirements must be completed within 10 years of starting coursework at The University of Akron or elsewhere. This refers to graduate work after receipt of a master's degree or the completion of 30 semester credits. Extensions of up to one year may be granted by the dean of the Graduate School under unusual circumstances.

*The doctoral program in engineering is an interdisciplinary program offered on a collegiate basis. In the descriptions of university doctoral degree requirements on the following pages, citations of department or departmental faculty should be interpreted as citations of college or collegiate faculty with specific reference to the doctoral program in engineering.

Credits

A doctorate is conferred in recognition of high attainment and productive scholarship in some special field of learning as evidenced by the satisfactory completion of a prescribed program of study and research; the preparation of a dissertation based on independent research; and the successful passing of examinations covering the special field of study and the general field of which this subject is a part. Consequently, the emphasis is on mastery of the subject rather than a set number of credits. Doctoral programs generally encompass the equivalent of at least three years of full-time study at the graduate level. A minimum of 50 percent of the total credits above the baccalaureate required in each student's doctoral program must be completed at the University. A maximum of six workshop credits may be applied to a doctoral degree. Such credits must be relevant to the degree program, recommended by the student's adviser and approved by the dean of the Graduate School.

No graduate credit may be received for courses taken by examination or for 500-numbered courses previously taken at the 400-number course level as an undergraduate without advance approval from the dean of the Graduate School.

Transfer Credits

Up to 50 percent of the total graduate credits above the baccalaureate required in a doctoral program may be transferred from an accredited college or university. All transfer credit must be at the "A" or "B" level in graduate courses. The course must be relevant to the student's program and fall within the 10-year limit if beyond the master's level. A student already admitted to the University must receive prior approval for transfer courses taken elsewhere.

A student admitted with a master's degree or equivalent will have work evaluated in relation to the student's program to determine transfer credit. Thirty semester credits are transferable from a master's degree.

A student seeking to transfer credits must have full admission and be in good standing at the University and the school in which the credits were achieved. Transfer credit shall not be recorded until a student has completed 12 semester credits at The University of Akron with a grade-point average of 3.00 or better.

Language Requirements

There is no University-wide foreign language requirement for the Ph.D. The student is required to demonstrate one of the following skills depending upon the particular program.

- Plan A: Reading knowledge, with the aid of a dictionary, of two approved foreign languages. At the discretion of the major department an average of "B" in the second year of a college-level course in a language will be accepted as evidence of proficiency in reading knowledge for that language; English may be considered as one of the approved foreign languages for a student whose first language is not English; and demonstrated competence in a research technique (e.g., statistics and/or computers) may be substituted for one of the two foreign languages. Under the last option, each department should define competence and publicize.

- Plan B: Comprehensive knowledge of one approved foreign language, including reading without the aid of a dictionary and such additional requirements as the department may impose.
- Plan C: In certain doctoral programs (counseling and guidance, elementary education, engineering, psychology, secondary education, urban studies) the demonstration of competence in appropriate research skills may serve as a substitute for the foreign language requirements.

Optional Department Requirements

Each department may determine requirements for a doctoral student with regard to entrance examinations, qualifying examinations, preliminary or comprehensive examinations and course sequences.

Advancement to Candidacy

A student should apply for advancement to candidacy after completion of one-half of the credits required for the degree in his or her program. A student must be fully admitted and in good standing to be advanced to candidacy.

Advancement to Candidacy forms must be submitted no later than May 15 for the January commencement and no later than September 15 for the May commencement. These forms are available in the office of the dean of the Graduate School or in the academic department.

Dissertation and Oral Defense

The ability to do independent research and demonstrate competence in scholarly exposition must be demonstrated by the preparation of a dissertation on some topic related to the major subject. It should represent a significant contribution to knowledge, be presented in a scholarly manner, reveal the candidate's ability to do independent research and indicate experience in research techniques.

A doctoral dissertation committee supervises and approves the dissertation and administers an oral examination upon the dissertation and related areas of study. This examination is open to the graduate faculty. The dissertation and oral examination must be approved by the committee before the dissertation is submitted to the Graduate School. Two copies of the dissertation are due in the Graduate School at least three weeks prior to commencement. These copies must be signed by the adviser, faculty reader, department head and college dean prior to submission to the dean of the Graduate School. A manual titled *Guidelines for Preparing a Thesis or Dissertation* is available in the Graduate School and all copies of the dissertation must conform to these instructions.

Graduation

To be cleared for graduation, a candidate must have completed the academic program with a grade-point average of at least 3.00; been advanced to candidacy; submitted an approved dissertation and passed an oral examination; filed an application for graduation with the registrar; paid all applicable fees; and met any other department and University requirements.



SECTION **Four**

Graduate studies

Buchtel College of Arts and Sciences

Claibourne E. Griffin, Ph.D., *Dean*
William H. Beyer, Ph.D., *Associate Dean*
William A. Francis, Ph.D., *Associate Dean*
Randall H. King, Ph.D., *Associate Dean*

DOCTOR OF PHILOSOPHY DEGREE

The following programs leading to the Doctor of Philosophy degrees are offered in the Buchtel College of Arts and Sciences: the Doctor of Philosophy in Chemistry, the Doctor of Philosophy in Counseling Psychology, the Doctor of Philosophy in History, and the Doctor of Philosophy in Psychology. The Doctor of Philosophy in Sociology is offered jointly with Kent State University and the Doctor of Philosophy in Urban Studies with Cleveland State University.

Doctor of Philosophy in Chemistry

The Doctor of Philosophy in Chemistry is granted for high scholarly achievement in analytical, inorganic, organic, physical or biochemistry. Students with either a baccalaureate or master's degree may be admitted to the program. They must satisfy the following requirements to receive the degree:

- Complete a course of study designed in consultation with an adviser or advisory committee including:
 - Completion of at least 90 credits beyond the baccalaureate degree including 24 credits of appropriate coursework.
- Complete monthly cumulative exam requirement.
- Complete oral exam requirement.
- Complete seminar requirement.
- Defend dissertation in an oral examination.
- Complete all general requirements for the doctor of philosophy degree.

Doctor of Philosophy in Counseling Psychology

The University of Akron offers a doctoral program in Counseling Psychology. The program allows the student a choice of entry points through the Psychology Department of the Buchtel College of Arts and Sciences or through the Counseling and Special Education Department of the College of Education. Students in both departments are expected to attain a level of broad scientific competence in the core areas of psychology; the biological, social, cognitive-affective, and individual bases of human behavior. Practicum and internship experiences are also required of all students and range from skill building in basic psychological assessment and counseling, to actual work with clients, to a year-long, full-time internship in an applied service setting. Pertinent information regarding the emphasis, orientation, and coursework for the Psychology Department entry is included below. Students receive exposure to both colleges through shared coursework and faculty involvement with dissertations but must choose a specialization in one department. The Collaborative Program in Counseling Psychology is accredited by the American Psychological Association.

The Department of Psychology offers a five-year Counseling Psychology program leading to a doctoral degree and, in general, is geared toward students who hold a B.A. in psychology. Program emphasis is strongly placed on a scientist-practitioner model of training. Beyond the basic core areas of psychology, students are expected to establish specific competencies in the areas of theory, research, and practice of Counseling Psychology. Academic preparation includes theories of individual and group psychotherapy, psychodiagnostics, vocational development theory, intelligence testing, research and statistics, and professional issues. Research and publication are greatly encouraged. Graduates typically seek out academic teaching, research and training positions, as well as positions in counseling centers and other mental health agencies.

Admission to the Collaborative Program in Counseling Psychology is handled through the department associated with the student's chosen entry point. Students must fulfill both Departmental and Graduate School admission requirements. Departures from the described program for Psychology Depart-

ment entry may be made only with the approval of the counseling psychology program faculty.

Requirements

The curriculum reflects the interdepartmental blend of the Collaborative Program in Counseling Psychology. Electives and other classes are to be planned along with the student's adviser.

	Credits
— Psychology core courses (610, 620, 630, 640)	16
— Counseling psychology core courses (653, 707, 710, 711, 712, 713, 714, 715)	30
— Practicum sequence (671, 672, 673, 795 (4+4), 796 (4+4))	28
— Advanced Psychological Tests and Measures (750)	4
— Electives (minimum)	6
— A statistics sequence that may be substituted for the doctoral language requirement	16
— Thesis credits (minimum)	8
— Dissertation credits (minimum)	12

- The comprehensive written examination is prepared, administered and graded by the faculty of the department in which the student is enrolled. At least one faculty member from each department participates in the oral portion of the comprehensive examination.
- Dissertation — at least one faculty member from each department is required on the student's dissertation committee.
- Internship — 2,000 hours postmaster's with 1,600 hours over no more than two years. The internship site must be approved in advance by the Collaborative Program Internship Committee.
- Students must attain a 3.50 GPA in the psychology core or perform satisfactorily on the core mastery examination in order to be eligible for M.A./Ph.D. standing in the Department of Psychology.

Doctor of Philosophy in History

The Doctor of Philosophy in History is granted primarily for high scholarly achievement in four fields of study selected by the student and for demonstrated ability to pursue independent research. Each student must:

- Fulfill admission requirements of the School.
- The Graduate Committee of the History Department will consider an applicant for admission if a person has a Master's degree or the equivalent and a grade-point average of 3.3 or better at the M.A. level from an accredited institution. Those holding a Master's degree from The University of Akron or other accredited institution should not assume that they will automatically be admitted to doctoral studies. In addition to the application made to the Graduate School of The University of Akron, the student must submit to the History Department the following materials:
- a personal statement of reasons for wishing to undertake doctoral study and the fields of study the student wishes to pursue;
 - three letters of recommendation from former professors;
 - a writing sample, preferably a seminar paper or other comparable scholarly work;
 - scores on the Graduate Record Examination, General Aptitude Test;
 - evidence of a reading knowledge of one foreign language or knowledge of an acceptable cognate field. Those whose native language is not English must demonstrate proficiency in English.

The History Department does not encourage applications for the doctoral program from students who have received both B.A. and M.A. degrees from The University of Akron. Special circumstances may warrant consideration, however, and the Graduate Committee reserves the right to judge applications on their own merit.

- Complete studies selected by the student in consultation with an advisory committee, including:
 - completion of 60 credits beyond master's degree requirements, including dissertation credit. Courses at the 500-level in the student's major and dissertation fields will not be counted toward the degree, and only 9 hours of 500-level courses in the student's secondary fields will be counted;
 - demonstration of competency in four fields of study selected from the following areas: ancient, medieval, modern Europe to 1815, modern Europe since 1789, England and the Empire, United States 1607 to present, Latin America, Far East, and history of science. Further, students will be required to sit for examinations in *three* fields chosen from the above list. They will continue to be examined in a fourth field as well, but it will be a specialty or sub-topic falling within one of the general fields listed above. The fourth field will be designed by the student and the student's advisor, in consultation with the student's doctoral committee and the Graduate Committee of the History Department. The student's dissertation will fall within this fourth field;
 - satisfactory performance in written and oral comprehensive examinations;
 - defense of the dissertation in an oral examination.

- A reading knowledge of two languages will be required. With the approval of the student's doctoral committee and the Graduate Committee, the student may substitute a cognate field for one of the two required languages when it seems appropriate for the student's general program.
- Complete all general requirements for the Doctor of Philosophy degree.

working toward the Doctor of Philosophy in Sociology must meet the following requirements:

- Take two of the following courses, such courses not to count toward meeting specialization requirements:

3850:631	Social Psychology
3850:645	Social Organization
3850:687	Social Change
3850:747	Urban Sociology
- Take two doctoral-level courses in theory. These courses are to be selected from the predetermined group of courses (see *Department of Sociology Graduate Student Handbook*).
- Complete two doctoral-level courses in methods/statistics. These courses are to be selected from the predetermined group of courses (see the department's graduate student handbook).
- Complete a specialty of at least 15 credits.
- Complete a minimum total of 30 credits (semester) in course work.
- Pass the doctoral comprehensive examination. This examination is given in the specialty area and will include an evaluation of methods, theory, and statistics as relevant to the specialty area.
- Fulfill residency requirement of the Graduate School.
- Complete foreign language requirement by one of four sequences as detailed in the department's graduate student handbook:
 - foreign language;
 - computer science;
 - statistics;
 - philosophy.
- Register for a minimum of 30 credits of dissertation credit, complete a dissertation and successfully defend it in an oral examination.

Degree Requirements (for a student admitted without the master's degree)

In addition to meeting the requirements for a student admitted with the master's degree, the student must meet the following requirements:

- Completion of the M.A. core course work.
- Completion of a research practicum (three credits). This may be waived for the student who already has sufficient research experience.
- Completion of a minimum of 60 credits of graduate-level (600 or higher) course work beyond the bachelor's degree.

Doctor of Philosophy In Urban Studies

The departments of urban studies of The University of Akron and Cleveland State University jointly offer a program leading to the Ph.D. in Urban Studies. Students admitted to the program may take courses at either campus and all doctoral committees contain members from both universities.

The program is designed to train professionals interested in the areas of policy analysis and evaluation, public administration, and urban and regional planning.

Admission

Admission to the Ph.D. program in Urban Studies requires a master's degree in an appropriate area and submission of the following materials: test results from the Graduate Record Examination, Graduate Management Aptitude Test, or the Miller's Aptitude Test; three letters of reference; a writing sample and statement of academic interests; and TOEFL test results for foreign students. Entering students must complete the following prerequisites or their equivalents in addition to the required Ph.D. coursework:

3980:600	Basic Quantitative Research	3
3980:601	Advanced Research and Statistical Methods	3
3980:611	Urban Administration	3
	or	
3980:630	Introduction to Planning and Practice and Theory	3
3980:640	Fiscal Analysis	3
3980:643	Urban Policy Analysis	3

Degree Requirements

The Ph.D. Program in Urban Studies has a required core of four courses consisting of two courses in advanced quantitative methods and two courses in urban theory. In addition, students must complete a major consisting of 24 credit hours (6 courses); and a minor consisting of 12 credits (4 courses). The major must be taken from one of the following specializations: Policy Analysis and Evaluation, Public Administration, and Urban and Regional Planning. The minor consists of an integrated set of courses offering a specialization in either a set of methodological tools such as advanced statistics, a body of theory such as economics, or an area of application such as health policy.

The doctoral major and minor can be completed through a combination of required courses, elective courses, and tutorials. The tutorials allow students

Doctor of Philosophy In Psychology

The Department of Psychology offers a doctoral degree in psychology with specialization in either industrial/organizational psychology, applied cognitive aging psychology, or industrial gerontological psychology.

A degree will be awarded to a student who, besides fulfilling the general requirements, has met the following specific requirements:

- Fulfill admission requirements of the Graduate School and department requirements as follows:
 - completion of master's degree including 30 graduate credits;
 - completion of master's core courses or equivalent;
 - attainment of a graduate grade-point average (GPA) of 3.25;
 - completion of Graduate Record Examination Aptitude and Advanced Psychology Test;
 - securing of three letters of recommendation;
 - Mastery of M.A. core courses with a minimum 3.50 GPA in 3750:610, 620, 630, 640 or successful performance on core mastery examination.
- Major field:
 - a minimum of 90 graduate credits including a 30-credit master's program. A student may be required to complete additional credits beyond the 90 minimum credit requirement;
 - completion of Ph.D. core courses in the student's specialty area: industrial/organizational, applied cognitive aging, or industrial gerontological psychology. Core courses are specified in the *Department of Psychology Graduate Student Manual*. The student is required to maintain at least a 3.00 GPA in core courses and overall courses;
 - completion of additional required and elective courses to be planned in conjunction with the student's faculty adviser and subject to approval by the department industrial/organizational, applied cognitive aging, industrial gerontological committees.
- Written comprehensive examinations:
 - satisfactory performance on doctoral written and oral comprehensive examinations in the student's major area of industrial/organizational psychology, applied cognitive aging, industrial gerontological psychology (refer to the department's graduate student manual).
- Dissertation research:
 - completion of 3750:899 *Dissertation Research*; (minimum 12 credits)
 - satisfactory performance on final oral examination and defense of dissertation research.
- Other requirements:
 - refer to the department's graduate student manual for other requirements or guidelines;
 - complete and fulfill general doctoral degree requirements of Graduate School.

Doctoral language requirements or appropriate alternative research skills and techniques may be prescribed by the student's advisory committee, depending upon the career plans of the student and upon the academic and/or scientific requirements of the dissertation.

Doctor of Philosophy In Sociology Akron-Kent Joint Ph.D. Program

The University of Akron and Kent State University departments of sociology offer a joint program leading to the Ph.D. degree. Faculty and students engaged in the joint doctoral program are for all intents and purposes involved in a single graduate program. Course work is offered at both campuses and faculty and students interchange freely.

Admission to the Program

A student may apply with a completed master's degree or equivalent or after at least one year of full-time course work or equivalent (18 credits) in the sociology master of arts program at The University of Akron. The course work must include the master of arts core sequence. Scores from either the Miller Analogies Test (MAT) or the aptitude portion of the Graduate Record Examination (GRE) are required as part of the doctoral application. Admission is limited to students whose records clearly indicate both scholarly and research potential.

Degree Requirements (for a student admitted with the master's degree or equivalent)

In addition to meeting the general requirements of the Graduate School, a student

to work in close cooperation with an individual faculty member and pursue research interest shared by the student and the faculty member.

Students must pass written and oral comprehensive examinations on the quantitative core courses and on their major area of specialization.

A minimum of 63 credits beyond the master's degree is required.

MASTER'S DEGREE

Programs of advanced study leading to the master's degree are offered by the departments of biology, chemistry, economics, English, geography, geology (earth science), history, mathematical sciences, modern languages (Spanish), physics, political science, psychology, sociology and urban studies. Before undertaking such a program, the student must show that the general requirements for admission to the Graduate School have been met, and the standard requirements for an undergraduate major in the area of the proposed graduate specialty have been met or that the student has performed work which the department approves as equivalent to an undergraduate major.

Biology

Degree Requirements

- Possess the equivalent of a biology undergraduate major with a GPA of 3.00 or higher in biology courses.
- Submit three letters of recommendation.
- Submit scores for Graduate Record Examination (Aptitude and Advanced Biology Tests).
- Submit a letter of proposed area of specialization within biology.

Master of Science

Thesis Option

The program is primarily for the student who will pursue a research career, including the student who intends to enter a doctoral program in the biological sciences.

- Course work in addition to the master's research and seminars (must be approved by the student's advisory committee) — 24 credits.
- Research and thesis — minimum of 12 credits.
- Participation in seminars — a maximum of four credits.
- The student's advisory committee may require the demonstration of reading proficiency in a foreign language appropriate to the field of study.

A minor may be taken in approved graduate courses including education. Summer study at a biological station is available.

Non-thesis Option

This program is designed exclusively for secondary school teachers for whom the M.S. probably will be a terminal degree and who do not need research experience. The program is open only to applicants possessing a teaching certificate or those coregistering with the College of Education and showing normal progress towards qualifying for a certificate.

The requirements are the same as the research option except that no thesis and research is undertaken, but a total of 40 credits of approved course work (including a maximum of four credits for seminar participation) is required.

For additional details concerning admission standards, degree requirements and selection of options, refer to the *Department of Biology Graduate Student Guide*.

Chemistry

Master of Science

- Chemistry course work — with the approval of the adviser, up to 12 credits may be taken in related areas — 24 credits.
- Research and thesis — six credits.
- Participation in departmental seminars.
- Demonstration of reading proficiency in a foreign language appropriate to the field of study prior to the last semester of enrollment.

Economics

Master of Arts

Thesis Option

A minimum of 30 credits of course work including a thesis equivalent to six credits of the 30 is required. If elected, a thesis must be written in an area of specialization in which the individual has taken at least two courses.

Non-thesis Option

A minimum of 30 credits of course work is required.

In addition to a specialization (a list of which is available from the department), at least 21 credits under each option must be at the 600 level in economics. The following courses are required:

3250:602	Macroeconomic Analysis I	3
3250:611	Microeconomic Theory I	3
3250:620	Applications of Mathematical Models to Economics*	3
3250:626	Statistics for Econometrics*	3

Exceptional departures from these requirements may be approved with the permission of the graduate faculty and department head.

Labor and Industrial Relations Option**

• Core:		
3250:530	Labor Market Policy	3
3250:610	Framework of Economic Analysis	3
3250:626	Statistics for Econometrics	3
3250:633	Theory of Wages and Employment	3
3250:634	Collective Bargaining I	3
3250:635	Labor Law I	3

Industrial Relation Track (for an individual interested in a career in industrial relations)

3250:636	Collective Bargaining II	3
3250:637	Employment Law	3

• Electives:		
3250:606	Public Finance	3
3250:615	Industrial Organization	3
3250:616	Antitrust Policy	3
3250:617	Economics of Regulation	3
3250:639	Public Sector Labor Markets	3
3750:610	Industrial Psychology	4
3850:649	Sociology of Work	3

- A total of 30 credits is required for the degree.

Courses taken outside the department must be approved (in writing) by the student's adviser prior to enrollment.

English

Master of Arts

Thesis Option

A minimum of 33 credits is required (27 credits of coursework and 6 credits of thesis). Of the 27 credits of coursework, 18 must be at the 600 level and 12 must be in literature or literary theory (exclusive of individual reading).

Non-thesis Option

A minimum of 36 credits is required, of which 24 must be at the 600 level and 24 must be in literature or literary theory (exclusive of individual reading).

Required Courses for Both Options

3300:506	Chaucer†	3
3300:570	History of the English Language† or	3
3300:670	Modern Linguistics†	3
3300:615	Shakespearean Drama†	3
3300:691	Bibliography and Literary Research	3

*These courses may be waived for the student who can demonstrate, in a qualifying exam, an adequate preparation in mathematics and statistics.

**The student should have a B.A./B.S. degree from an accredited college or university and some background in labor and industrial relations. An interested student who has no background may take the following courses:

3250:201	Principles of Macroeconomics	3
3250:202	Principles of Microeconomics	3
3250:330	Labor Problems	3
6500:321,2	Quantitative Bus. Analysis I, II	6

†Unless the student has passed a comparable course at the undergraduate level with a grade of "B" or better.

Alternate Track in Composition

Alternate Track in Composition is intended for students interested in the teaching of English in secondary schools and in the teaching of writing and literature at two-year and four-year colleges. The degree is also appropriate for those planning to enter a doctoral program in composition and rhetoric. The program does not lead to state certification for teaching; students should consult the Department of Secondary Education for requirements for state certification to teach in the public schools.

Thesis Option

A minimum of 33 credits is required (27 credits of coursework and 6 hours of thesis. Of the 27 credits of coursework, 18 must be in composition studies (including courses in composition, linguistics, and rhetoric) and 9 credits in literature or literary theory (exclusive of individual reading). Of the 27 credits of coursework, 15 must be at the 600 level.

Non-thesis Option

A minimum of 36 credits is required, only 6 of which may be individual reading. At least 24 credits required in composition studies (including courses in composition, linguistics, and rhetoric) and 9 credits in literature or literary theory (exclusive of individual reading). Of the 36 credits of coursework, 21 must be at the 600 level.

Required Courses for Both Options

3300:576	Theory and Teaching of Basic Composition	3
3300:670	Modern Linguistics	3
3300:673	Theories of Composition	3

Other Available Courses for Both Options

Composition and Rhetoric:

3300:575	Theory of Rhetoric	2
3300:674	Research Methodologies in Composition	3
3300:679	Scholarly Writing	3
3300:689	Seminar: Reading Theory	3

Linguistics:

3300:570	History of the English Language	3
3300:571	U.S. Dialects: Black and White	3
3300:589	Grammatical Structures of Modern English	3
3300:589	Sociolinguistics	3
3300:689	Contextual Linguistics	2-3

Literature and Literary Theory:

Any approved department offering at the 500 or 600 level.

Graduate Foreign Language Requirement for All Master's Degrees in English:

The language requirement for the M.A. in English and the M.A. in English: Alternate Track in Composition is as follows:

Demonstration of reading proficiency in a foreign language appropriate to English. Completion of one junior- or senior-level course in a foreign language (with a grade of "B" or better) will exempt the student from examination provided the course was taken no more than five years before the student began his or her graduate work.

Note: 3300:600 Teaching College Composition Practicum (1100:111 for 2 credits and 1100:112 for 2 credits) are required for Teaching Assistants. They do not count toward the degree requirement.

Geography

Master of Arts Master of Science

- Complete a minimum of 30 credits, of which 16 must be in geography courses. A minimum of 12 credits (exclusive of thesis) must be at the 600 level. The 30 credits must include the following:

3350:581	Geographic Research Methods	3
3350:583	Spatial Analysis	3
3350:687	History of Geographic Thought	3
- Thesis (M.A. only) — four to six credits.
- Statistics (M.S. only) — eight credits.
- Successful completion of a comprehensive examination administered by the departmental committee.

The student who has undergraduate deficiencies in cartography, geographic research techniques and spatial analysis will be expected to remedy these by taking appropriate courses with the advice of the head of the department.

Courses taken outside the department must be approved by the department prior to enrollment.

Geology

Master of Science

- Complete a minimum of 30 credits of which at least 10 credits shall be at the 600 level and no more than two in research problems and six in thesis research.
- Proficiency examination at the beginning of program to determine weaknesses in undergraduate preparation. The student who demonstrates a lack of basic knowledge will be required to take appropriate undergraduate courses. The student may not begin formal thesis work until he/she has successfully passed the proficiency examination and has corrected deficiencies from same. (Formal thesis work includes thesis proposal and/or thesis research credits). Field camp can be taken for graduate credit; however, it will not count toward the 30 credits for the M.S. in the geology or geophysics options.
- Core requirements:

3370:680	Seminar in Geology	2
3370:699	Thesis Research	6
- Pass comprehensive examination after completion of 18 credits. Examination may be attempted twice.
- Oral presentation and defense of thesis.

Degree Specialization

The program of each individual will be adapted to his/her career objectives.

Geology

Equivalents of the current geology, cognate science and mathematics requirements for the University's B.S. in geology are required.

Earth Science

Equivalents of the current geology courses for the University's B.A. in geology are required. Course program will be selected to provide the student with a well-rounded background in lithosphere, hydrosphere and atmosphere. Those who will be teachers must take 5300:780 *Seminar in Secondary Education: Earth Science* or equivalent.

Geophysics

Equivalents of the geology, cognate science and mathematics requirements for the University's B.S. in geophysics are required.

Engineering Geology

This program is for the graduate engineer and geologist who wishes to broaden expertise in the other field. The entering student who has some deficiencies in either engineering or geology may have to satisfy one or more of the following requirements while proceeding with graduate studies.

3370:101	Introductory Physical Geology	4
3370:210	Geomorphology	3
3370:350	Structural Geology	4
3450:221,2,3	Analytical Geometry Calculus I, II, III	12
4300:201	Statics	3
4300:202	Introduction to Mechanics of Solids	3
4300:313	Soil Mechanics	3
4300:314	Geotechnical Engineering	3

- Required courses:

3370:631	Rocks and Minerals (or equivalent)	4
4300:611	Fundamentals of Soil Behavior	2
4300:614,5	Foundation Engineering I, II	6

Environmental Geology

Equivalents of the current science and mathematics requirements for the University B.S. in geology are required. As many as eight credits may be selected from engineering, biology and/or geography with the approval of a geology adviser.

History

Master of Arts

- Admission to the program requires completion of at least 15 semester or 22 quarter credits in history as an undergraduate. *Historical Methods* or an equivalent should be part of the entering student's preparation. If it is not, this course must be taken at the earliest opportunity but will not be counted toward fulfillment of the graduate credit requirement. Those who apply for graduate assistantships are required to submit their applications scores on the Graduate Record Examination general aptitude test.
- Satisfactory completion of a minimum of 30 credits of graduate study in history, of which six may be in individual reading courses.
- Three fields of study, one of which must be unrelated to the other two, and two of which must be chosen from among the following fields:

Ancient	America to 1865
Medieval	United States Since 1865
Europe, Renaissance to 1815	Latin America
Europe, 1815 to the Present	East Asia
England and the Empire	History of Science

The third field may be chosen from the above history fields or from an approved cognate discipline.

The student must pass an appropriate written examination in two of the three fields. The third field requirement will be met by at least seven credits of work at the graduate level. If the student does not pass an examination unconditionally, the examining faculty may re-examine the student orally or require the student to take another written examination after a lapse of three months. No written examination may be repeated more than once.

- A course in historiography (may be waived if such a course has been taken on the undergraduate level).
- An appropriate foreign language or other research skill shall be required by the student's master's committee if it is necessary to a student's program of study. A reading knowledge of a foreign language is desirable and may be necessary for admission to a doctoral program.
- At least 16 hours of 600-level work, exclusive of historiography and individual reading. May be fulfilled in one of the following ways:*

Option I

Three reading seminars and one writing seminar, with the writing seminar paper read and approved by two faculty members.

Option II

Two reading and two writing seminar sequences under different professors with the writing seminar paper of the student's choice read and approved by two faculty members.

Option III

Two reading seminars, one writing seminar and a thesis read and approved by two faculty members.

Mathematical Sciences

Master of Science — Mathematics

Completion of a placement process prior to the beginning of classes in the student's first semester in the program. This process will consist of a review by a graduate faculty subcommittee of the student's competency in Advanced Calculus I and II (3450:521,2) and Abstract Algebra I (3450:511). If the student fails any part of this review, then that course will be added to the required courses for the student and the total number of credits required for the degree will reflect this.

• Core:

Two of the following three courses:		
3450:510	Advanced Linear Algebra	3
3450:512	Abstract Algebra II	3
3450:611	Topics in Algebra	3
And all of the following courses:		
3450:621	Real Analysis	3
3450:622	Measure Theory	3
3450:625	Analytic Function Theory	3
3450:692	Mathematical Sciences Seminar	2

Thesis Option (30-39 credits)

In addition to the placement review and core requirements, 9-11 credits of 500/600-level courses in mathematics (3450), statistics (3460) or approved computer science (3460) and 2-4 credits in 3450:699 thesis research must be completed. Any graduate-level course may be substituted as an elective provided that this is approved beforehand by the student's advisory committee.

Non-thesis Option (33-42 credits)

In addition to the placement review and core requirements, 16 credits of 500/600-level courses in mathematics (3450), statistics (3460) or approved computer science (3460) must be completed. Any graduate-level course may be substituted as an elective provided that this is approved beforehand by the student's advisory committee.

Successful completion of the comprehensive examinations in the two courses selected from among 3450:510, 512 or 611 and in the courses 3450:621,622, and 625.

Master of Science — Statistics

- Entrance into the program will require the initial completion of the following prerequisites:

3470:561	<i>Applied Statistics I</i> , four credits; or equivalent.
3450:601	<i>Introduction to Analysis</i> , four credits; or equivalent (may not be used to meet degree requirements for mathematical sciences majors).
3470:620	<i>Applications of Matrices to Statistics</i> , three credits; or equivalent. (May be taken concurrently with 3470:651 <i>Probability and Statistics</i> , four credits.)

• Core curriculum:

3470:651	Probability and Statistics	4
3470:652	Advanced Mathematical Statistics	3
3470:655	Linear Models	3
3470:663	Experimental Design	3
3470:665	Regression and Correlation	3
3450:692	Mathematics and Statistics Seminar	2

Thesis Option (30 credits of graduate work)

In addition to the core curriculum, 8-10 credits in 500/600-level mathematical sciences courses and 2-4 credits in 3470:699 Thesis Research must be completed.

Non-thesis Option (33 credits of graduate work)

In addition to the core requirements, 15 credits in 500/600-level mathematical sciences courses must be completed.

- A comprehensive examination, taking the form suggested by the department, must be completed in the thesis or non-thesis option.
- With the consent of the department, up to six credits of approved graduate-level electives outside the department may be substituted in the thesis or non-thesis option.

Master of Science — Applied Mathematics

Option I

Completion of a placement process prior to the beginning of classes in the student's first semester in the program. This process will consist of a review by a graduate faculty subcommittee of the student's competency in Advanced Calculus I and II (3450:521,2) and of his or her background in at least one junior-level or higher course in engineering or physics. If the student fails any part of this review, then that course will be added to the required courses for the student and the total number of credits required for the degree will reflect this.

• Core:

3450:510	Advanced Linear Algebra	3
3450:621	Real Analysis	3
3450:625	Analytic Function Theory	3
3450:627.8	Advanced Numerical Analysis I, II	6
3450:633.4	Methods of Applied Mathematics I, II	6
3450:692	Mathematical Sciences Seminar	2

Thesis Option (30-39 credits)

In addition to the placement review and core requirements, three to five credits of approved 500/600 level courses in mathematics (3450), statistics (3460) or computer science (3460) and two to four credits in 3450:699 Thesis Research must be completed. Any graduate level course may be substituted as an elective provided that this is approved beforehand by the student's advisory committee.

Non-thesis Option (33-42 credits)

In addition to the placement review and core requirements, ten credits of approved 500/600 level courses in mathematics (3450), statistics (3460) or computer science (3460) must be completed. Any graduate-level course may be substituted as an elective provided that this is approved beforehand by the student's advisory committee.

Successful completion of the Comprehensive Examination in the courses 3450:621, 625, 627, 633 and 634.

Option II

Completion of a placement process prior to the beginning of classes in the student's first semester in the program is required. This process will consist of a review by a Graduate Faculty subcommittee of the student's competency in Advanced Calculus I and II (3450:521-522) and Mathematical Models (3450:536). If the student fails any part of this review, then that course will be added to the required courses for the student and the total number of credits required for the degree will reflect this.

3450:510	Advanced Linear Algebra	3
3450:621	Real Analysis	3
3450:627	Advanced Numerical Analysis I	3
3450:635	Optimization	3
3450:636	Advanced Combinatorics and Graph Theory	3
3470:651	Probability and Statistics	4
3470:650	Advanced Probability and Stochastic Process	3
3450:692	Mathematical Sciences Seminar	2

Thesis Option (30-39 credits)

In addition to the placement review and core requirements, two to four credits of approved 500/600-level courses in mathematics (3450), statistics (3460) or computer science (3460) and two to four credits in 3450:699 Thesis Research must be completed. Any graduate-level course may be substituted as an elective provided that this is approved beforehand by the student's advisory committee.

*Where disagreement occurs between readers in Option I, II or III, the director of Master's Studies will choose a faculty member to arbitrate the disagreement.

Non-thesis Option (33-42 credits)

In addition to the placement review and core requirements, nine credits of approved 500/600-level courses in mathematics (3450), statistics (3460) or computer science (3460) must be completed. Any graduate-level course may be substituted as an elective provided that this is approved beforehand by the student's advisory committee.

Successful completion of the Comprehensive Examinations in the courses 3450:621, 627, 635, 636 and 3470:651 is required.

Physics**Master of Science**

- Complete a minimum of 30 graduate credits of approved courses in physics. Up to six credits of graduate-level electives outside the department may be included in the program. There is no foreign language requirement for this degree.
- A cumulative grade-point average of 3.00 or better for all graduate-level credits applicable toward the degree.
- Complete an approved program of courses which includes the following required courses:

3650:551,2	Advanced Laboratory I, II	4
3650:615	Electromagnetic Theory I	3
3650:625	Quantum Mechanics I	3
3650:641	Lagrangian Mechanics	3
3650:661	Statistical Mechanics	3

A student preparing for further graduate work in a physical science or for academic or industrial employment should include the following courses in the graduate program:

3650:581,2	Methods of Mathematical Physics I, II	6
3650:616	Electromagnetic Theory II	3
3650:626	Quantum Mechanics II	3

A student preparing for teaching secondary school science should include the following courses in the graduate program:

3650:500	History of Physics	3
3650:504	Energy and Environment	3
3650:568	Digital Data Acquisition	2
3650:590	Workshops (maximum credit)	6

A student must pass a comprehensive examination of a form suggested by the department. This exam consists of two parts, as follows:

Part I: The basic exam must be passed by all degree candidates. This is a written examination covering the fields of mechanics, electricity and magnetism, optics, thermodynamics and modern physics at the undergraduate level.

Part II: Completion of at least one of the following options:

Option A: An advanced written examination covering the fields of quantum physics, electricity and magnetism, atomic and nuclear physics, mechanics and experimental physics at the beginning-graduate level.

Option B: A formal report, based upon an original research project, submitted in a form suitable for publication and approved by a physics faculty committee.

Option C: A master's thesis.

- Graduate research participation is strongly encouraged. Up to five credits may be earned in 3650:697 *Graduate Research*, upon the completion of a graduate research project. One additional credit may, upon approval by the department, be permitted in 3650:699 *Master's Thesis Research* for the completion of a master's thesis based on such research. A successful thesis may thus account for up to six of the total of 30 graduate credits required.

Political Science**Master of Arts****Admission**

Admission is open to students who have completed a four-year undergraduate degree and who fulfill the admission requirements of the Graduate School. The Graduate Record Examination (GRE) is not required.

The Master of Arts in Political Science allows students to concentrate their study in one of four areas: American Politics, Comparative Politics, International Politics, or Political Theory.

Students may also work toward certificates in Applied Politics and Public Policy in conjunction with their graduate studies.

Degree Requirements

- Complete 30 credits of graduate work, including 18 credits at the 600 level.

Two required core courses:

3700:600	Scope and Theory of Political Science	3
3700:601	Research Methods in Political Science	3

Three additional departmental seminars - 9 credits (Neither Independent Research, Thesis, nor Internship is considered a graduate seminar)

Three additional credits at the 600 level

Twelve additional credits at the graduate level

- Pass a comprehensive written examination covering one field (*American Politics, Comparative Politics, International Politics, or Political Theory*)
- Complete **either** of the following:

A master's **thesis**, including six hours of thesis credit (3700:699) in preparation. These credits may be presented as part of the overall 30-credit requirement. Thesis topic and completed thesis must be approved by the student's thesis committee and the student must complete a successful oral defense of the thesis.

A **non-thesis option**, which shall consist of two extended seminar papers approved by a department committee of three persons chosen by the student with the approval of the graduate adviser.

Psychology**Master of Arts**

- Fulfill admission requirements of the Graduate School and the following departmental requirements:

- equivalent of psychology undergraduate major including a general or introductory course, statistics course and experimental psychology course;
- GPA of 3.00 in psychology courses;
- Graduate Record Examination, Aptitude and Advanced Psychology Test;
- three letters of recommendation.

- Course requirements:

- completion of a minimum of 30 credits of graduate psychology courses including the M.A. core courses or equivalents, specialty area required courses and electives as specified in the department's graduate student manual;
- a student is required to maintain at least a 3.00 grade-point average in M.A. core courses as well as overall.

- Master of Arts examination (first year):

- thesis option: Mastery of M.A. core courses with a minimum of 3.25 GPA in 3750:610,620,630,640 or successful performance on core mastery examination.
- non-thesis option: written and oral comprehensive examinations in the specialty areas;

- Other requirements:

- refer to the *Department of Psychology Graduate Student Manual* for additional guidelines;
- complete and fulfill general master's degree requirements of the Graduate School.

Thesis Option

Completion of a minimum of 30 credits of graduate work including thesis in industrial/organizational, counseling or applied cognitive aging psychology.

Non-thesis Option

Completion of a minimum of 30 credits of graduate work with no thesis required. Completion of coursework, practicum and examinations in either personnel, counseling or applied cognitive aging psychology.

Sociology**Master of Arts**

- Complete three required core courses with at least a 3.00 grade-point average:

3850:603	Sociological Research Methods	3
3850:604	Social Research Design	3
3850:617	Sociological Theory	3

Thesis Option

Satisfactory completion of 32 semester credits of which at least 21 must be at the 600 level or higher in sociology or anthropology (excluding 3850:699; 3850:697 and 3850:698). In meeting these requirements the student must:

- Complete five required core courses with at least a 3.00 grade-point average:

3850:603	Sociological Research Methods	3
3850:604	Social Research Design	3
3850:617	Sociological Theory	3
3850:631	Social Psychology	3
	or	
3850:645	Social Organization	3
3850:706	Multivariate Techniques in Sociology	3

- Complete at least six hours of thesis work (3850:699). No more than six credits will count toward the degree.

- Completion of master's thesis and successful oral defense of thesis.

Non-thesis Option

This degree is intended for the student who wants intensive substantive training in a specialized area.

Completion of 32 credits of graduate work with no more than six credits taken at the 500 level. In meeting these requirements the student must:

- Complete four required core courses with at least a 3.00 grade-point average:

3850:603	Sociological Research Methods	3
3850:604	Social Research Design	3
3850:617	Sociological Theory	3
3850:631	Social Psychology	3
	or	
3850:645	Social Organization	3
- Completion of at least 15 credits in a contracted specialty area. This area must be defined in consultation with the student's adviser and approved by the Graduate Studies Committee. Courses from other departments may be taken to meet the specialty requirement.
- Pass an oral examination on the specialty area.

Anthropology

There is no graduate degree in anthropology. However, there are many graduate courses available. A student interested in taking such courses for graduate credit must be admitted to the Graduate School through an existing graduate program, or may apply for non-degree status through the Department of Sociology. The student should enroll in graduate courses only for specific professional preparation or enhancement and with the permission of the instructor. Inquiries should be directed to the graduate director in the Department of Sociology.

Spanish**Master of Arts**

- Thirty-two semester credits of graduate work which may include a thesis amounting to four credits.
- Requirement: proficiency level in listening comprehension, speaking, reading and writing Spanish.
- Second language requirement: completion of 202 with a grade of at least "B" in another language; or a translation from another language. Choice of the second language will be left to the student in consultation with an adviser.
- Final comprehensive examinations: the candidate will be required to submit two graduate essays, each of which is subject to an oral exam.

Urban Studies**Master of Arts in Urban Studies**

Courses may be taken outside the Department of Urban Studies for the purpose of fulfilling any of the requirements listed below but must be approved by the department prior to registration.

Each student will, upon entering the program and in consultation with a faculty adviser, plan a complete course of study.

- Core:

3980:600	Basic Quantitative Research	3
3980:601	Advanced Research and Statistical Methods	3
3980:602	History of Urban Development	3
3980:699	Thesis (optional)	3

Basic Program

Complete 34 credits of coursework as follows:

- Core — 12 credits.
- Selection of recommended courses — six credits.
- Urban related courses — 16 credits.
- 3 credits of approved electives may be substituted for thesis with approval of academic advisor.

Option**Urban Planning**

Forty-five credits of coursework (plus internship where applicable) as follows:

- Core requirements:

3980:600	Basic Quantitative Research	3
3980:601	Advanced Research and Statistical Methods	3
3980:602	History of Urban Development	3
3980:699	Thesis (optional)	3
- Planning requirements:

3350:536	Urban Land Use Analysis	3
3980:630	Introduction to Planning Practice and Theory	3
3980:631	Urban Facilities Planning	3
3980:632	Land Use Planning Law	3

3980:637	Implementation of Planning Techniques	3
3980:638	Field Methods in Urban and Regional Planning Laboratory	3
3980:670	Planning Research	3

• Electives:

Four elective courses totaling 12 credits or more should be selected in consultation with the faculty adviser.

• Internship:

3980:695	Required for students who do not have professional planning experience	3
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- 3 credits of approved electives may be substituted for Thesis with approval of academic advisor.

Master of Public Administration

The Program in Public Administration is specifically designed to prepare the student for a public service career in public management and administration, as well as the management and administration of non-profit organizations. The program of study is accredited by the National Association of Schools of Public Affairs and Administration (NASPAA).

Admission

Admission is open to students who have completed a four-year undergraduate degree, whose academic records meet the standards required for admission to the Graduate School. No specific field of undergraduate major is required for admission. The GRE score is not required for admission to the MPA.

Degree Requirements

- The number of graduate credits required for the MPA will be as follows:

Master's Degree in Public Administration	42 credits
(plus 3 credits of internship.)	

• Core requirements:

3980:600	Basic Quantitative Research	3
3980:601	Advanced Research and Statistical Methods	3
3980:610	Legal Foundations of Public Administration	3
3980:611	Introduction to the Profession of Public Administration	3
3980:614	Ethics and Public Service	3
3980:615	Public Organization Theory	3
3980:616	Personnel Management in the Public Sector	3
3980:640*	Fiscal Analysis	3
3980:642*	Public Budgeting	3
3980:643	Introduction to Public Policy	3
3700:670	Seminar in The Administrative Process	3
3980:699	Thesis (optional)	3
3985:695	Internship	1-3
	(May be repeated for a total of 3 credits)	

*Note: Students may take 3250:606 Public Finance and 3250:506 State and Local Public Finance to fulfill the requirements of 3980:640 Fiscal Analysis and 3980:642 Public Budgeting. Students must, however, take both 3250:606 and 3250:506 or both 3980:640 and 3980:642.

Permission to take Fiscal Analysis will be based on the student's performance on a diagnostic covering basic economic principles. The diagnostic will be taken and evaluated at the beginning of each school year. Based on performance students will be given permission to enroll in the course or be required to take one or more preparatory courses. These courses will generally consist of 3250:600 Foundations of Economic Analysis and 3250:610 Framework of Economic Analysis.

Any required course except 3980:690, Urban Studies Seminar, may be waived on the basis of proficiency in the area covered by the course. The criteria for waiver are:

- Completion of a comparable course in another department at the University.
- Transfer of course credit from another university.
- Proficiency in an area demonstrated by a group of courses or other work done in the area covered by the course.

• Advanced Elective Courses

3980:612	National Urban Policy	3
3980:613	Intergovernmental Management	3
3980:622	Urban Planning and Health Care	3
3980:636	Parks and Recreation	3
3980:641	Urban Economic Growth and Development	3
3980:650	Comparative Urban Systems	3
3980:670	Research for Futures Planning	3
3980:671	Program Evaluation	3
3700:630	Seminar in National Politics	3
3700:641	Seminar in Intergovernmental Relations	3
3250:639	Public Employee Collective Bargaining	3
3250:666	Seminar on Regional Economic Analysis and Development	3
3980:680	Selected Topics: Regional Planning	3
3980:680	Selected Topics: Urban Housing Policy	3
3980:673	Computer Applications for Public Organizations	3
3980:617	Leadership and Decision Making in Local Government	3
3980:697	Individual Studies	1-3
3980:590	Workshop	1-3

Joint Programs

Joint Degree Programs in Law and Urban Planning and Law and Public Administration.

The University offers joint J.D. and Urban Planning and J.D. and Public Administration programs. The titles are: J.D./M.A. Urban Planning and J.D./M.P.A.

To be accepted into the program, a student must meet the admission requirement of the School of Law, the Graduate School and the Department of Urban Studies.

J.D./Master of Urban Planning Degree Requirements

Seventy-six credits in law and 33 credits in urban planning.

Under this program, a student must take 43 credits of required law courses, 32 credits of law electives and 33 credits of required urban planning courses plus urban studies internship of one to three credits. (Internship is required of any student without professional planning experience.)

J.D./Master of Public Administration Degree Requirements

Seventy-six credits in law and 30 credits in public administration.

Under this program a student must take 43 credits of required law courses, 32 credits of law electives and 30 credits of required public administration courses plus urban studies internship of three credits. (Internship is required of any student without professional administrative experience.)

These programs reduce the total existing credit hours of Law School and Urban Studies as follows:

J.D./M.A. Urban Planning

The law requirements are reduced by nine credit hours from 85 to 76 while urban planning requirements are reduced by 12 credit hours from 45 to 33.

J.D./M.A. Public Administration

The law requirements are reduced by nine credit hours from 85 to 76, while public administration requirements are reduced by 12 credit hours from 42 to 30.

College of Engineering

Nicholas D. Sylvester, Ph.D., *Dean*

Max S. Willis, Jr., Ph.D., *Associate Dean, Research and Graduate Studies*

S. Graham Kelly III, Ph.D., *Associate Dean, Undergraduate Studies*

DOCTOR OF PHILOSOPHY IN ENGINEERING

The Doctor of Philosophy in Engineering is an interdisciplinary doctoral program offered on a collegiate basis.

Admission Requirements

In addition to the Graduate School's requirements for admission to the doctoral program, an applicant for the Doctor of Philosophy in Engineering must hold a bachelor's degree from a program that is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology at the time of graduation, or provide satisfactory evidence of an equivalent academic background to the dean of engineering and the appropriate departmental head.

If a student already holds a master's of science degree, the applicant must provide satisfactory evidence of an equivalent engineering baccalaureate background to the dean of Engineering and the appropriate departmental head.

Applicants with a bachelor's or master's degree in a discipline other than engineering will be required to complete a specific, formal set of courses as specified by the appropriate department prior to admission to the doctoral program in engineering.

Each applicant must submit official undergraduate transcripts, undergraduate grade point average, at least two letters of recommendation, and official results of the verbal, quantitative, and analytical portions of the GRE. Personal statements or descriptions of post-baccalaureate experience that provide a rationale for the proposed graduate study may also be submitted.

An application with a bachelor's degree must have a cumulative grade point average of at least 3.0. An applicant with a master's degree must have a cumulative graduate grade point average of at least 3.5.

Applicants whose native language is not English must have a TOEFL score of at least 550, and also must submit their score on the Test of Written English (TWE).

A student not satisfying the requirements for Full Admission may be classified as a Provisional Admission or a Deferred Admission.

Doctoral Requirements

In addition to the University's doctoral degree requirement, the student must:

- Pass a departmental Qualifying Examination. The purpose of the qualifying examination is to determine admissibility to the doctoral program and any technical weakness.
- Identify an interdisciplinary field of major study, a minor field of study, a dissertation director, and an Interdisciplinary Doctoral Committee.
- Complete a formal plan of study that is acceptable to the Interdisciplinary Doctoral Committee. The plan of study must have at least 48 credits of course work, of which 42 credits must be at the 600 and 700 level. At least 24 of these course credits must be completed at The University of Akron. The minimum total credit hours for the doctoral program is 96 credit hours.
- Satisfy the language requirement specified by the Interdisciplinary Doctoral Committee.
- Pass a Candidacy Examination: The purpose of the candidacy examination is to test the student's ability to conduct independent research.
- Present an acceptable Dissertation Proposal that describes the proposed research to the Interdisciplinary Doctoral Committee.
- Present and defend the dissertation to the Interdisciplinary Doctoral Committee.

A copy of the *Ph.D. in Engineering Program Procedures* is available from the dean of engineering.

JOINT PROGRAM

Coordination for the M.D. and Ph.D. Between the Department of Biomedical

Engineering, The University of Akron and the Northeastern Ohio Universities College of Medicine.

I. Introduction and Purpose

The Department of Biomedical Engineering of The University of Akron and NEOUCOM agree to cooperate to provide a coordinated program for those desiring both the M.D. and Ph.D. degrees. It is recognized that such cooperation is to the benefit of both institutions.

This coordinated program does not change in any way the requirements for either the M.D. at NEOUCOM or the Ph.D. at The University of Akron. The program allows for the timing of requirements to be met in such a manner that a shorter total time would be required for completion of both degrees than if the degrees were completed separately and individually. This program will also help integrate the knowledge and skills acquired by the student in each of the programs.

II. Routes of Admission

1. Entry from undergraduate (or master's level) programs in engineering, biology, chemistry, or other pre-medicine fields into both the M.D. and Ph.D. programs.
2. Entry from the B.S./M.D. program into the M.D. and Ph.D. programs.

All students will be required to have completed the following minimum courses and to have taken the MCAT prior to admission into the coordinated M.D. and Ph.D. programs.

M.D.	Principles of Chemistry I and II
M.D.	Organic Chemistry I and II
M.D.	Principles of Biology I and II
M.D., Ph.D.	Classical Physics I and II
Ph.D.	Statics
Ph.D.	Dynamics
Ph.D.	Strength of Materials (or Material Science)
Ph.D.	Basic Electrical Engineering (or Circuits I & II)
Ph.D.	Calculus I, II, III and Differential Equations.

III. Structure of Degree Programs

Each individual coordinated degree program will be tailored to suit the background and research interests of the student.

Additional information may be obtained from the Department of Biomedical Engineering at The University of Akron or NEOUCOM.

MASTER'S DEGREE

The degrees Master of Science in Chemical Engineering, Master of Science in Civil Engineering, Master of Science in Electrical Engineering, Master of Science in Mechanical Engineering and Master of Science in Engineering are offered.

Master of Science in Chemical Engineering

Thesis Option

		Credits
4200:600	Transport Phenomena	3
4200:605	Chemical Reaction Engineering	3
4200:610	Classical Thermodynamics	3
	Chemical Engineering Electives**	6
	Approved Electives	6
	Approved Mathematics	3
	Thesis	6

The thesis must be satisfactorily defended in an oral examination. The student must pass a comprehensive examination and is expected to attend and participate in the department seminars.

Nonthesis Option

4200:600	Transport Phenomena	3
4200:605	Chemical Reaction Engineering	3
4200:610	Classical Thermodynamics	3
	Chemical Engineering Electives***	6
	Approved Electives	18
	Approved Mathematics	3

***The elective chemical engineering courses may not include more than three credits of 500-level courses.

The student must pass a comprehensive examination and is expected to attend and participate in the department seminars.

Master of Science In Civil Engineering

Areas of study in the department include: structural mechanics, and geotechnical, hydraulic and environmental engineering.

Thesis Option

Civil Engineering Coursework	15
Approved Mathematics or Science	3
Approved Electives	6
Thesis	6

The thesis must be satisfactorily defended in an oral examination.

Nonthesis Option

Civil Engineering Coursework	15
Approved Mathematics or Science	3
Approved Electives	12
Special Problems	2

Master of Science In Electrical Engineering

Areas of study in the department include: computer engineering, control system engineering, power system engineering and related areas.

Thesis Option

Electrical Engineering Coursework*	15
Approved Mathematics	6
Approved Electives	3
Thesis	6

The thesis must be defended in an oral examination.

Nonthesis Option**

Electrical Engineering Coursework*	18
Approved Mathematics	6
Approved Electives	12

A student must pass a graduate-level oral comprehensive examination which may be taken after 24 credits have been completed.

Master of Science In Mechanical Engineering

There are three main areas of graduate study in mechanical engineering: systems and controls, engineering mechanics and thermal-fluid sciences. Every student in the department will be encouraged to take at least one mechanical engineering course outside the main area of interest. It is the purpose of this course to develop some breadth in graduate education.

The basic requirements are as follows:

Thesis Option

Mechanical Engineering Course Work†	15
Approved Mathematics	3
Approved Electives	6
Thesis	6

The thesis must be defended in an oral examination.

Nonthesis Option

Mechanical Engineering Course Work†	15
Approved Mathematics	3
Approved Electives	12
Special Problems	2

Master of Science In Engineering

This program is intended for the student whose educational objectives cannot be met by the chemical, civil, electrical or mechanical departmental programs or those who wish to specialize in biomedical engineering.

Thesis Option

Engineering Coursework	12
Approved Mathematics or Science	3
Approved Electives	9
Thesis	6

The thesis must be defended in an oral examination.

Nonthesis Option

Engineering Coursework	18
Approved Mathematics or Science	3
Approved Electives	9
Special Problems	2

The overall program is administered by the dean. A student should declare to the dean the intention to study toward the Master of Science in Engineering degree before the completion of 10 graduate credits. Later admission to the program may be granted upon petition to the dean.

Upon admission, the dean will appoint an advisory committee consisting of at least two faculty members selected from the interdisciplinary divisions of the college. The committee members will be from at least two departments. The special problem section and final report must receive the approval of the advisory committee.

Biomedical Engineering Specialization

- Core:

4800:601	Biomedical Instrumentation	4
4800:611	Biometry	3
4800:697	ST: Physiology for Engineers and Lab	5
- Tracks: 9 credits from either Track I or II
 - Track I:
 - Biomedical Signals and Systems courses numbered 4800:620-639 and approved 4800:697 courses.
 - Track II:
 - Biomechanics and Biomaterials courses numbered 4800:640-669 and approved 4800:697 courses.
- Approved electives 6
- Thesis:

4800:699	Thesis	6
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Polymer Engineering Specialization

A description of this program is given under the College of Polymer Science and Polymer Engineering.

*The required electrical engineering course work of 18 credits may not include more than three credits of 500-level courses.

**The 36 credit requirement in the non-thesis option became effective for new incoming students in 1988.

†The program is limited to not more than three 500-level courses in engineering. Not more than two of the 500-level courses can be applied to the 15 credits of mechanical engineering course work. For a student specializing in systems and controls, and electing the thesis option, six credits of non-mechanical engineering courses in the area of systems and controls may be substituted for six of the required 15 credits of mechanical engineering courses. Prior written approval from the student's adviser must be obtained. The limitations on 500-level courses still apply in each category for a student in systems and controls.

College of Education

William E. Klingele, Ed.D., *Dean*

Larry G. Bradley, Ph.D., *Associate Dean*

Charles M. Dye, Ph.D., *Assistant Dean*

Pearlmarie W. Goddard, Ed.D., *Assistant to the Dean*

DOCTOR OF PHILOSOPHY DEGREE

Programs leading to the Doctor of Philosophy degree in elementary education, secondary education, counseling psychology, and guidance and counseling are offered through the College of Education. The degree will be awarded to the student who, in addition to filling the general requirements of the Graduate School, has met the following specific requirements:

- Completion of the Miller Analogies Test and/or the Graduate Record Examination. (Check departments for minimum score requirements.)
- A minimum of 90 or 120 graduate credits (including a 30-credit master's program where applicable, [Counseling Psychology and Counseling require a minimum of 120 credit hours] including the doctoral dissertation. A student considered deficient in any area may be required to take additional courses.
- Completion of a foundation studies program designed to prepare the student before specialization.
- Completion of preliminary examinations on foundation studies and the major field of concentration.
- Successful completion of a test in a language judged not to be the student's native tongue:
 - a student in the Department of Counseling and Special Education may elect to develop appropriate research skills prescribed by the adviser in lieu of the foreign language requirements;
 - a student in the Department of Elementary Education may elect to develop appropriate alternative research skills prescribed by the adviser, subject to review by the department head, depending upon the career goal of the student and upon the academic and/or scientific requirement of the dissertation in lieu of the foreign language requirement;
 - a student in the Department of Secondary Education may elect to develop appropriate research skills prescribed by the adviser, subject to review by the department head, in lieu of the foreign language requirement.
- Completion of at least eight credits in cognate area.
- Completion of final written and oral examinations in the student's major field of concentration.
- Completion of a dissertation comprising not more than 20 credits. The oral examining committee must be constituted of at least five full-time faculty members, one of whom must be from outside the college.
- Pass the general requirements for the Doctor of Philosophy degree.

DOCTORAL PROGRAMS IN COUNSELING

Collaborative Ph.D. Program in Counseling Psychology

The Collaborative Program in Counseling Psychology allows the student a choice of entry options: one through the College of Education for students with a master's degree and one through the College of Arts and Sciences for students with a baccalaureate degree. Students in both tracks are expected to attain a level of broad scientific competence in the core areas of psychology: the biological, social, cognitive-affective and individual bases of human behavior. Counseling psychology coursework covers the special areas of group counseling, theories of counseling and psychotherapy, supervision, vocational psychology, ethics, assessment and research design. Practica and internship experiences are required of students in both tracks and range from skill building in basic psychological assessment and counseling, to actual work with clients, to a year-long, full-time internship in an applied service setting. Students receive exposure to both colleges through shared coursework and faculty involvement with dissertations but must formally enter through one or the other of the colleges.

The American Psychological Association (APA) has conferred accreditation on the Ph.D. Program in Counseling Psychology.

Admission to the Collaborative Program in Counseling Psychology will be handled through the department associated with the student's chosen emphasis.

Departures from the program may be made only with the approval of the counseling psychology program faculty. Students may be considered for admission to counseling psychology if they have a master's degree in counseling, guidance and counseling, psychology, school psychology or a related field.

- Psychology Core (3750:610, 620, 630, 640) is required of all students.
- Students register for dual listed courses (3750/5600) under their home department code.
- The comprehensive written examination is prepared, administered and graded by the department faculty of the track in which the student is enrolled. At least one faculty member from each track participates in the oral portion of the comprehensive examination.
- Dissertation — at least one faculty member from each track is required on the student's dissertation committee.
- Internship — 2,000 hours post-master's with 1,600 hours over no more than two years. The internship site must be listed in the Association of Psychology Internship Centers (APIC) Directory.
- Language and residency requirements are to be completed in accordance with the guidelines from the Graduate School and the student's home department.
- Collaborative Program requirements

3750:612	Psychology Core I	4
3750:620	Psychology Core II	4
3750:630	Psychology Core III	4
3750:640	Psychology Core IV	4
3750/5600:653	Group Counseling	4
3750/5600:707	Supervision in Counseling Psychology I	3
3750/5600:710	Theories of Counseling and Psychotherapy	4
3750/5600:711	Vocational Behavior	4
3750/5600:712	Principles and Practice of Intelligence Testing	4
3750/5600:713	Advanced Seminar in Counseling Psychology	4
3750/5600:714	Objective Personality Evaluation	4
3750/5600:715	Research Design in Counseling I	3
3750/5600:796	Counseling Psychology Practicum	8
	Electives (permission of adviser required)	6
5600:896	Dissertation (minimum)	15
	Internship	NC

- Counseling and Special Education Track requirements:

	College of Education Foundations	6*
5100:640	Techniques of Research	3
5100:741	Statistics in Education	3
5100:743	Advanced Educational Statistics	3
5600:643	Counseling: Theory and Philosophy	3
5600:645	Group Testing in Counseling	3
5600:647	Career Development and Counseling Across the Life Span	3
5600:651	Techniques of Counseling	3
5600:675	Practicum in Counseling I	5
5600:708	Supervision in Counseling Psychology II	3
5600:716	Research Design in Counseling II	3
	Electives	7

*Students must elect a minimum of six graduate credits in behavioral, humanistic, historical and/or social-philosophical studies from the following:

5100:600	Philosophies of Education	3
5100:602	Comparative and International Education	3
5100:604	Topical Seminar in the Cultural Foundations of Education	3
5100:620	Behavioral Bases of Education	3
5100:624	Seminar: Educational Psychology	3
5100:701	History of Education in American Society	3
5100:703	Seminar: History and Philosophy of Higher Education	3
5100:705	Seminar: Social-Philosophical Foundations of Education	3
5100:721	Learning Processes	3
5100:723	Teacher Behavior and Instruction	3

Ph.D. in Guidance and Counseling*

The doctoral program in Guidance and Counseling is designed for students who hold a master's degree in counseling psychology or a related field. The program allows the student a choice of three specialty areas: (1) Counselor Education; (2) Clinical Mental Health Counseling; and (3) Marriage and Family Therapy. Students in each specialty are expected to attain an advanced level of com-

*In order to be admitted into the doctoral program, a student must have completed a master's degree in Guidance and Counseling or a master's degree in a related field. Students must have completed graduate coursework in each of the following areas prior to enrolling in courses in their Ph.D. major of Guidance and Counseling.

- 1) an introductory course in school counseling, student personnel services, community counseling, or marriage and family therapy;
- 2) group testing;
- 3) career or vocational counseling;
- 4) counseling theory;
- 5) individual counseling;
- 6) group counseling;
- 7) practicum in counseling;
- 8) research techniques

sistent with their career goals. With the proper selection of courses, graduates of the program can meet the academic requirements for a Licensed Professional Clinical Counselor in Ohio. Graduates with a specialty in Marriage and Family Therapy with the proper selection of courses can meet the academic requirements for membership in the American Association for Marriage and Family Therapy.

The Council for Accreditation of Counseling and Related Educational Programs (CACREP), a specialized accrediting body recognized by the Council on Postsecondary Accreditation (COPA), has conferred accreditation on the Ph.D. Program in Guidance and Counseling in the Department of Counseling and Special Education.

Requirements

- Master's Degree 31-34
- Foundations of Education 9
- Major: Guidance and Counseling
- Research and Statistics
 - 5100:741 Statistics in Education 3
 - 5100:743 Advanced Educational Statistics 3
 - 5600:715 Research Design in Counseling I 3
 - 5600:716 Research Design in Counseling II 3
 - (Must be taken after admission to the doctoral program)
 - 5600:756 Outcome Research in Marriage and Family Therapy 3
 - (Required only in specialty area)
- Also required:
 - 5600:685 Internship** 3-6
 - 5600:702 Advanced Counseling Practicum 8
 - 5600:707 Supervision in Counseling Psychology I 3
 - 5600:708 Supervision in Counseling Psychology II 3
 - 5600:720 Topical Seminar 6
 - 5600: Specialty Courses in Counseling*** 12
- Cognate

Cognate coursework must be taken outside the College of Education and approved by the major adviser. 10
- Electives

Electives to be selected with the approval of the student's major adviser. 10
- Dissertation 15

Normally, a minimum of 60 semester hours must be taken after the student is admitted into the doctoral program in guidance and counseling.

DOCTOR OF PHILOSOPHY IN ELEMENTARY EDUCATION

The program leading to a Doctor of Philosophy Degree in Elementary Education is designed to enhance the professional growth of the practicing teacher academically and professionally. The program is predicated on the belief that an effective educator benefits from a well-planned program containing depth of study in three basic areas:

- A specific teaching area/subject discipline
- Professional education
- Other contributing disciplines

With this philosophy in mind, the program provides study in a selected discipline, professional education, and cognate fields.

Course offerings are designed to present the required courses as well as those areas that will be explored in overcoming individual deficiencies and expanding the students' academic background. Basic minimum course requirements are in the following areas: (1) core, (2) teaching field, (3) professional education, and (4) cognate area. Three guidelines concerning these steps toward the degree are of particular significance.

- Preliminary examination must be taken at first scheduled opportunity after student's full admission.
- Written comprehensive should be taken after the completion of 60 hours of work and prior to the completion of 75 hours.
- Dissertation must be approved by the student's committee and reviewed by the dean of the College of Education.

The complete program description may be obtained from the department head of elementary education.

**A minimum of one academic year of full-time internship is required. An internship taken as part of a master's degree program may account for up to 50 percent of this requirement. If this is the case, the student is required to complete only three semester hours of 5600:685 after admission to the doctoral program.

***Selected with the approval of the student's major adviser.

DOCTOR OF PHILOSOPHY IN SECONDARY EDUCATION

The Department of Secondary Education offers a program leading to the Ph.D. This program is designed to meet the needs and interests of persons in public, postsecondary, higher education and other institutions or agencies that might have educational programs.

A qualified student can, with consultation of an adviser, design a "field of study" to meet his/her career objectives within the expertise and resources of the department.

For further details contact the Department of Secondary Education on program options and specific admission requirements.

DOCTOR OF EDUCATION DEGREE

The Department of Educational Administration offers a program leading to the Doctor of Education degree. One option is designed for persons in public or private K-12 educational organizations.

An option in Higher Education Administration is also offered by the department. This is designed for persons who wish to pursue a career in college, university or other post-secondary administrative positions. The program addresses such major institutional functions as: academic administration, student services, finance, planning, development and public relations. A student will have the opportunity to direct studies toward a particular career goal. A student may be admitted after either the bachelor's or the master's degree.

- Minimum Requirements of the K-12 Program
 - Foundations (including dissertation) 31
 - School Administration (including doctoral residency seminar) 26
 - Curriculum and Supervision 12
 - Cognate 12
 - General Electives 9
- Minimum Requirements of the Higher Education Administration Program
 - Foundations (including dissertation) 31
 - Educational Administration 16
 - Curriculum, Instruction and Student Services 6
 - Doctoral Residency Seminar 3
 - Cognate 12
 - General Electives 22

Foundation Studies Education — Doctoral Program Requirements*

Behavioral Studies

- 5100:620 Behavioral Bases of Education 3
- or
- 5100:624 Seminar in Educational Psychology 3
- 5100:721 Learning Processes 3
- or
- 5100:723 Teaching Behavior and Instruction 3

Humanistic Studies

- 5100:701 History of Education in American Society 3
- or
- 5100:703 Seminar in History and Philosophy of Higher Education 3

Social and Philosophical Studies

- 5100:600 Philosophies of Education 3
- or
- 5100:602 Comparative and International Education 3
- or
- 5100:604 Seminar in Cultural Foundations of Education 3
- 5100:705 Seminar in Social-Philosophical Foundations 3

Research

- 5100:640 Techniques of Research 3
- 5100:741 Statistics in Education 3
- 5—:899 Dissertation 10-20

*Counseling psychology students contact adviser for requirements.

Continuous Doctoral Program Enrollment

All students admitted to the doctoral program must register for a minimum of one semester hour of graduate credit as approved by their advisers during each fall and spring semester. Individual departments may exceed this minimum requirement. Doctoral students should consult their advisers about additional requirements.

MASTER'S DEGREE

Programs leading to the degree of M.A. in education, M.S. in education and M.S. in technical education are offered.

The student who expects to earn the master's degree for advancement in the field of teaching must meet the general requirements for admission to Graduate School and must be qualified to hold a standard teaching certificate. Exceptions to this latter requirement will be made for the qualified student who does not wish to teach or perform duties in the public schools provided the student presents or acquires an appropriate background of study or experience. The student who expects to earn the master's degree in guidance and administration also should have had successful teaching experience. A physical examination may be required if and when indicated. Any student who exhibits a deficiency in English or other skills may be required to correct it before recommendation for an advanced degree. The student must receive a pass grade on the relevant Master's Comprehensive Exam.

No more than six credits of workshops or institutes can be used to satisfy degree requirements.

The student must complete a minimum of nine credits in foundation studies in education.**

5100:600	Philosophies of Education	3
	or	
5100:602	Comparative and International Education	3
	or	
5100:604	Seminar in Cultural Foundations of Education	3
5100:620	Behavioral Bases of Education	3
	or	
5100:624	Seminar in Educational Psychology	3
5100:640	Techniques of Research	3

PROGRAMS

Counseling and Special Education

Selected program offerings in the Department of Counseling and Special Education are available to a person with or without a teaching certificate. Interdisciplinary programs offered lead to certification by the Ohio State Department of Education and/or a master's degree. Program areas include counseling, school psychology and special education. The person who meets program prerequisites and who has earned a master's degree may matriculate as a non-degree graduate student and pursue a program that leads, in selected areas, to certification.

The Council for Accreditation of Counseling and Related Educational Programs (CACREP), a specialized accrediting body recognized by the Council on Post-secondary Accreditation (COPA), has conferred accreditation on the Community Counseling program and the Counseling in Elementary or Secondary Schools program in the Department of Counseling and Special Education.

The Marriage and Family Therapy program has been accredited by the American Association of Marriage and Family Therapy (AAMFT).

Classroom Guidance for Teachers

- Foundation Studies courses — nine credits.

- Guidance courses - 21 credits.

5600:610	Counseling Skills for Teachers	3
5600:631	Elementary School Guidance	3
	or	
5600:633	Secondary School Guidance	3
5600:645	Group Testing in Counseling	3
5600:647	Career Development and Counseling Across the Life Span	3
5600:663	Seminar in School Counseling	3
5600:671	Counseling Clinic: Test Interpretation	1
5600:695	Field Experience§	1
5610:540	Developmental Characteristics of Exceptional Individuals	4
	or	
5610:604	Education and Management Strategies for Parents of Exceptional Individuals	3

- Area of concentration: 5-8 credits

- A minimum of eight credits may be selected from one of the following (the student may, with adviser approval, propose an area of concentration not listed). The courses in the area of concentration must be selected with, and approved by, an adviser.

Middle School Education
 Early Childhood Education
 School and Community Relations
 Curriculum and Instruction
 Physical Fitness and Well-Being
 Special Education
 Computers in Education
 Family Ecology
 Communicative Disorders
 Outdoor Education
 Counseling

Community Counseling

- Foundation Studies courses — nine credits. (See department handbook for options.)

- Required courses:

5600:600	Seminar in Counseling	1
5600:620	Topical Seminar: Substance Abuse and Sexuality	2
5600:635	Community Counseling	3
5600:643	Counseling Theory and Philosophy	3
5600:645	Group Testing in Counseling	3
5600:647	Career Development and Counseling Across the Life Span	3
5600:651	Techniques of Counseling	3
5600:653	Group Counseling	4
5600:665	Seminar: Counseling Practice**	3
5600:671	Counseling Clinic§	1
5600:675	Practicum in Counseling I	5
5600:685	Internship	4

- Electives (select a minimum of five credits *only* with help of adviser). 5

Counseling in Elementary or Secondary Schools

- Foundation Studies courses — nine credits.

5100:604	Topical Seminar in Cultural Foundations	3
5100:624	Seminar: Educational Psychology	3
5100:640	Techniques of Research	3

- Required courses

5600:600	Seminar in Counseling	1
5600:620	Topical Seminar: Substance Abuse and Sexuality	2
5600:631	Elementary School Guidance	3
	or	
5600:633	Secondary School Guidance	3
5600:643	Counseling Theory and Philosophy	3
5600:645	Group Testing in Counseling	3
5600:647	Career Development and Counseling Across the Life Span	3
5600:651	Techniques of Counseling	3
5600:653	Group Counseling	4
5600:659	Organization and Administration of Guidance Services	4
5600:663	Seminar in School Counseling**	3
5600:671	Counseling Clinic§	1
5600:675	Practicum in Counseling I	5
5600:685	Internship	4
5610:540	Developmental Characteristics of Exceptional Individuals	3

Marriage and Family Therapy

- Foundations Studies courses — nine credits. (See department handbook for options.)

- Required courses — 38 credits.

5600:600	Seminar in Counseling	1
5600:645	Group Testing in Counseling	3
5600:647	Career Development and Counseling Across the Life Span	3
5600:651	Techniques of Counseling	3
5600:653	Group Counseling	4
5600:655	Marriage and Family Therapy: Theory and Techniques	3
5600:665	Seminar: Counseling Practice**	3
5600:667	Marital Therapy	3
5600:669	Systems Theory in Family Therapy	3
5600:671	Counseling Clinic§	1
5600:675	Practicum in Counseling I	5
5600:685	Internship	6

- Specialized studies (see department handbook for options). 10

**Students in some psychology programs may choose other options — see adviser.

§ Must be taken concurrently with 661.

**Must be taken with 645.

§ Must be taken with 685.

School Psychologist §§

• College requirements:		
5100.640	Techniques of Research	3
5620.694	Research Project	2
	or	
5620.698	Master's Problem	2-4
	or	
5620.699	Thesis Research	4-6
Departmental requirements:		
5600.643	Counseling: Theory and Philosophy	3
• Program requirements:		
3750.530	Psychological Disorders of Childhood	4
3750.700	Survey of Projective Techniques	4
3750.712	Principles and Practice of Individual Intelligence Testing	4
5100.604	Seminar in Cultural Foundations of Education	3
5100.624	Seminar in Human Learning	3
5100.741	Statistics in Education	3
5620.600	Seminar: Role and Function of School Psychology	3
5620.602	Behavioral Assessment	3
5620.610	Educational Diagnosis for the School Psychologist	4

Sixth-Year School Psychology Master's Degree and Certification Program

• Foundations requirements:		
5100.604	Seminar in Cultural Foundations	3
5100.624	Seminar in Educational Psychology	3
5100.640	Techniques of Research	3
5100.741	Statistics in Education	3
• Professional requirements:		
3750.700	Survey of Projective Techniques	4
3750.530	Psychological Disorders of Childhood	4
3750.712	Principles and Practices of Individual Intelligence Testing	4
5600.643	Counseling: Theory and Philosophy	3
5620.600	Seminar: Role and Function of School Psychology	3
5620.602	Behavioral Assessment	3
5620.610	Educational Diagnosis for the School Psychologist	4
5620.694	Research Project in Special Area	2-3
	or	
5620.698	Master's Problem	2-4
	or	
5620.699	Thesis Research	4-6

The student completing the master's program who desires Ohio certification must additionally complete the following listed certification/professional course requirements including the full academic year internship experience:

3750.500	Personality	4*
5610.543	Developmental Characteristics of Learning Disabled Individuals	3
	or	
5250.683	Reading Diagnosis: School Psychology and Support Personnel	3
5610.540	Developmental Characteristics of Exceptional Individuals	3*
	or	
3750.520	Abnormal Psychology	3*
5620.601	Cognitive Function Models: Principles of Educational Planning	3
5620.603	Consultation Strategies for School Psychology	3
5620.611	Practicum in School Psychology (this course is repeated once for a total of eight credits)	4

The nine-month, full-time internship and the associated seminars entail the following registration:

5620.630	Internship: School Psychology	3
5620.631	Internship: School Psychology	3
5620.640	Field Seminar I: Issues and Assessment	2
5620.641	Field Seminar II: Classroom Environment	2

The student who does not hold a valid Ohio teaching certificate must additionally complete the following course pattern:

5200.630	Elementary School Curriculum and Instruction	2
5620.695/696	Field Experience: Master's	3
5700.631	Elementary School Administration	2
	or	
5700.601	Principles of Educational Administration	3

The student completing the above listed program will be recommended for Ohio certification if his/her credit pattern numbers 60 graduate semester credit hours, counting no more than 15 semester hours at the 500 level, and including the 10 hours credit for the internship and the associated intern seminars.

§§Program admission is competitive based upon state internship allocations. Selection procedures and criteria are available upon request by calling the school psychology program director in the Department of Counseling and Special Education. For recommendation for certification as a school psychologist in Ohio, the master's student must additionally complete the program prescribed under "Certification."

*Required as part of Special Education master's.

Special Education

The graduate program in special education is designed for those individuals holding an undergraduate degree in special education. Applicants who do not hold such a degree may be admitted to graduate study in special education as Non-Degree admissions until 12 graduate credits of "B" or better are completed.

No more than six hours of 500-level graduate course work or six hours of workshop credit at the graduate level may be included in the minimum master's degree program in special education.

The master's degree program in special education is a cross-categorical focus with emphases on master's teaching, curriculum design, research, program development and clinical practice. The minimum program is 39 semester hours. Additional hours are necessary for the completion of the Supervisor's Certificate. The required additional course work for this certificate is specified below.

It is important that an appointment be made with the student's assigned adviser very early in his or her graduate studies. A signed contract specifying the student's program and timeline for completion must be completed with the adviser by the time the student has earned nine hours of graduate course work.

Additional hours are also necessary for teacher certification in special education. The adviser will assist in program planning.

All requirements must be completed within six years after beginning graduate-level course work at The University of Akron or elsewhere.

• Foundation core (nine credits):		
5100.600	Philosophies of Education	3
	or	
5100.604	Topical Seminar in Cultural Foundations of Education	3
5100.620	Behavioral Bases of Education	3
	or	
5100.624	Seminar: Educational Psychology	3
5100.640	Techniques of Research	3
• Departmental core (21 credits):		
5600.610	Counseling Skills for Teachers	3
5610.601	Seminar: Curriculum Planning in Special Education	3
	or	
5610.605	Program Development and Service Delivery Systems in Special Education	3
5610.606	Research Design and Practice in Special Education	3
5610.603	Assessment and Educational Programming in Special Education*	3
5610.604	Education and Management Strategies for Parents of Exceptional Individuals*	3
5610.612	Issues in Special Education	3
• Department: Master's Papers (choose three credits):		
5610.694	Research Project in Special Area (Scholarly Paper)	3
5610.698	Master's Problem: Special Education	3
5610.699	Thesis Research: Special Education	3
• Electives (minimum of nine credits)		
• Completion of at least nine hours with the approval of your major adviser. (May include a directed field experience.)		
• Certification: <u>Special Education Supervisor.</u>		
The supervisor's certificate may be issued to a holder of a master's degree, plus 27 months teaching experience in the area to be supervised and completion of the following course work:		
5100.600	Philosophies of Education	3
5100.620	Behavioral Bases of Education	3
5100.640	Techniques of Research*	3
5700.610	Principles of Education Supervision	3
5700.609	Principles of Curriculum Development	3
5610.601	Seminar: Curriculum Planning in Special Education	3
5610.602	Supervision of Instruction in Special Education	3
5700.695	Field Experience for Supervisors	2

Educational Administration

The Department of Educational Administration offers a master's degree program in general administration which is not directed toward a particular administrative or supervisory certificate. With the help of an adviser and approval of the Graduate School, courses may be substituted and/or waived to create specialized options. Requirements of the standard program and examples of two such specialized programs are listed below:

General Administration (Standard Program)

• Foundation Studies — nine credits.		
• Required courses:		
5700.601	Principles of Educational Administration	3
5700.603	Administration of Educational Personnel	2
5700.606	Evaluation in Educational Organizations	3

*May be waived if completed as undergraduate.

5700:607	School Law	2
5700:608	School Finance and Economics	3
5700:615	Computer Applications in Educational Administration	2
5700:684	Field Experience I: Elementary Administration	2
	or	
5700:686	Field Experience I: Secondary Administration	2
	or	
5700:895	Field Experience I: The Superintendency	2
5700:706	Collective Bargaining and Employee Relations	2
5700:707	The Superintendency	3

Higher Education Administration (Specialized Option)

- Foundation studies — nine credits. (5100:703 is required.)
- Required courses:

5600:649	Counseling and Personnel Service in Higher Education	3
5700:601	Principles of Educational Administration	3
5700:704	Advanced Principles of Educational Administration	2
5700:720	Seminar: Law in Higher Education	3
5700:720	Seminar: Finance in Higher Education	2
5900:700	Introductory Administrative Colloquium in Higher Education	1
5900:730	Curriculum and Program Planning in Higher Education	3
5900:800	Advanced Colloquium in Higher Education	1
5900:801	Internship in Higher Education	2
5900:802	Internship Seminar	1
	Elective	1

School Treasurer (Specialized Option)

- Foundation studies — nine credits.
- Required courses:

5700:602	School Business Administration	2
5700:607	School Law	2
5700:608	School Finance and Economics	3
5700:697	Independent Study in School Fiscal Management	3
5700:706	Collective Bargaining and Employee Relations	2
5700:707	The Superintendency	3
5700:795/796	Internship	2
6200:601	Financial Accounting	3
6200:649	State and Local Taxation	2

Elementary School Principal

Objectives

- Provide the student with an understanding of the elementary school and its history, its present purpose and its potential.
- Assist the prospective administrator in perceiving the role of the elementary principal and determining whether it is appealing as a career choice.
- Provide the student with the opportunity to experiment with alternate leadership styles in order to determine how the student might best lead.
- Coordinate classroom activities with field experiences in order to exercise the student's administrative skills and test the student's ability to relate understandings to performance.

Program

- Foundation Studies — nine credits.
- Administration courses:

5200:630	Elementary School Curriculum and Instruction	2
5200:732	Supervision of Instruction in the Elementary School	2
5700:601	Principles of Educational Administration	3
5700:607	School Law	2
5700:610	Principles of Educational Supervision	3
5700:613	Administration of Pupil Services	2
5700:615	Computer Applications in Educational Administration	2
5700:631	Elementary School Administration	3
5700:684	Field Experience I: Elementary Administration	2

Post-Master's Degree Requirements for Ohio Certification as an Elementary School Principal:

5700:603	Administration of Educational Personnel	2
5700:604	School-Community Relations	3
5700:606	Evaluation in Educational Organizations	3
5700:608	School Finance and Economics	3
5700:694	Field Experience II: Elementary Administration	3
5700:706	Collective Bargaining and Employee Relations in Education	2

- Total for Certification: 46 credits.

Secondary School Principal

Objectives

- Enable the student to gain a knowledge of the overall curriculum of the secondary school.
- Provide the student with an understanding of successful methods of improving instruction in the secondary school.

- Provide the student with practice in implementing a program to improve instruction.
- Develop within each student the ability to communicate successfully with individuals and groups.
- Work with the individual and the group successfully to improve the educational program.
- Implement technical aspects of secondary education.

Program

- Foundation Studies courses — nine credits.
- Administration courses:

5300:619	Secondary School Curriculum and Instruction	2
5300:721	Supervision of Instruction in the Secondary School	2
5700:601	Principles of Educational Administration	3
5700:607	School Law	2
5700:610	Principles of Educational Supervision	3
5700:613	Administration of Pupil Services	2
5700:615	Computer Applications in Educational Administration	2
5700:620	Secondary School Administration	3
5700:686	Field Experience I: Secondary Administration	2

Post-Master's Degree Requirements for Ohio Certification as a Secondary School Principal:

5700:603	Administration of Educational Personnel	2
5700:604	School-Community Relations	3
5700:606	Evaluation in Educational Organizations	3
5700:608	School Finance and Economics	3
5700:696	Field Experience II: Secondary School Administration	3
5700:706	Collective Bargaining and Employee Relations in Education	2

- Total for Certification: 46 credits.

Administration Specialists

The Department of Educational Administration offers programs leading to each of the seven Educational Administrative Specialist certificates granted by the Ohio Department of Education.

Each of these specialist certification programs consists of a master's degree program and a post-master's block. In the individual program listings below, master's degree requirements are marked with a single asterisk (*) and post-master's requirements are indicated by double asterisks (**).

Administrative Specialist: Business Management

- Foundation Studies — nine credits.*
- Required courses:

5700:601	Principles of Educational Administration*	3
5700:602	School Business Administration**	2
5700:603	Administration of Educational Personnel*	2
5700:606	Evaluation in Educational Organizations*	3
5700:607	School Law*	2
5700:608	School Finance and Economics*	3
5700:612	Administration of Educational Facilities**	2
5700:615	Computer Applications in Educational Administration*	2
5700:684	Field Experience I: Elementary Administration*	2
	or	
5700:686	Field Experience I: Secondary Administration*	2
	or	
5700:695	Field Experience for Supervisors*	2
5700:706	Collective Bargaining and Employee Relations*	2
5700:707	The Superintendency*	3
5700:895	Field Experience: The Superintendency**	2
5700:897	Independent Study: Business Management**	3
6200:601	Financial Accounting**	3
6500:600	Management and Production Concepts**	3

Administrative Specialist: Educational Research

- Foundation Studies — nine credits.*
- Required courses:

5100:642	Topical Seminar: Measurement and Evaluation**	3
5100:741	Statistics in Education**	3
5100:743	Advanced Educational Statistics**	3
5100:801	Research Seminar**	3
5100:897	Independent Study: Educational Research**	1
5700:601	Principles of Educational Administration*	3
5700:603	Administration of Educational Personnel*	2
5700:606	Evaluation in Educational Organizations*	3
5700:607	School Law*	2
5700:608	School Finance and Economics*	3
5700:615	Computer Applications in Educational Administration*	2
5700:684	Field Experience I: Elementary Administration*	2
	or	
5700:686	Field Experience I: Secondary Administration*	2
	or	
5700:695	Field Experience for Supervisors*	2
5700:706	Collective Bargaining and Employee Relations*	2
5700:707	The Superintendency*	3

Administrative Specialist: Educational Staff Personnel Administration

- Foundation Studies — nine credits.*
- Required courses:
 - 5700:601 Principles of Education Administration* 3
 - 5700:603 Administration of Educational Personnel* 2
 - 5700:606 Evaluation in Educational Organizations* 3
 - 5700:607 School Law* 2
 - 5700:608 School Finance and Economics* 3
 - 5700:610 Principles of Educational Supervision** 3
 - 5700:615 Computer Applications in Educational Administration* 2
 - 5700:684 Field Experience I: Elementary Administration* 2
 - or
 - 5700:686 Field Experience I: Secondary Administration* 2
 - or
 - 5700:695 Field Experience for Supervisors* 2
 - 5700:704 Advanced Principles of Educational Administration** 3
 - 5700:705 Decision-Making in Educational Administration** 3
 - 5700:706 Collective Bargaining and Employee Relations* 2
 - 5700:707 The Superintendency* 3
 - 5700:895 Field Experience: The Superintendency** 2
 - 6500:654 Industrial Relations** 3

- 5700:684 Field Experience I: Elementary Administration* 2
- or
- 5700:686 Field Experience I: Secondary Administration* 2
- or
- 5700:695 Field Experience for Supervisors* 2
- 5700:706 Collective Bargaining and Employee Relations* 2
- 5700:707 The Superintendency* 3
- 5700:895 Field Experience: The Superintendency** 2
- 7600:625 Theories of Mass Communication** 3
- 7600:628 Contemporary Public Relations Theory** 3

Administrative Specialist: Instructional Services

- Foundation Studies — nine credits.*
- Required courses:
 - 5200:630 Elementary School Curriculum and Instruction** 2
 - 5300:619 Secondary School Curriculum and Instruction** 2
 - 5700:601 Principles of Educational Administration* 3
 - 5700:603 Administration of Educational Personnel* 2
 - 5700:606 Evaluation in Educational Organizations* 3
 - 5700:607 School Law* 2
 - 5700:608 School Finance and Economics* 3
 - 5700:609 Principles of Curriculum Development** 3
 - 5700:610 Principles of Educational Supervision** 3
 - 5700:615 Computer Applications in Educational Administration* 2
 - 5700:684 Field Experience I: Elementary Administration* 2
 - or
 - 5700:686 Field Experience I: Secondary Administration* 2
 - or
 - 5700:695 Field Experience for Supervisors* 2
 - 5700:697 Independent Study: Instructional Services** 3
 - 5700:706 Collective Bargaining and Employee Relations* 2
 - 5700:707 The Superintendency* 3
 - 5700:895 Field Experience: The Superintendency** 2
- 5700:695 Field Experience for Supervisors* 2
- 5700:706 Collective Bargaining and Employee Relations* 2
- 5700:707 The Superintendency* 3
- 5700:895 Field Experience: The Superintendency** 2

Administrative Specialist: Special Education (Exceptional Children)

- Foundation Studies — nine credits.*
- Required courses:
 - 5610:540 Developmental Characteristics of Exceptional Individuals** 3
 - 5610:601 Seminar: Curriculum Planning** 3
 - 5610:602 Supervision of Instruction: Special Education** 3
 - 5610:605 Program Development and Delivery Systems** 3
 - 5610:697 Independent Study: Exceptional Children** 1
 - 5700:601 Principles of Educational Administration* 3
 - 5700:603 Administration of Educational Personnel* 2
 - 5700:606 Evaluation in Educational Organizations* 3
 - 5700:607 School Law* 2
 - 5700:608 School Finance and Economics* 3
 - 5700:615 Computer Applications in Educational Administration* 2
 - 5700:684 Field Experience I: Elementary Administration* 2
 - or
 - 5700:686 Field Experience I: Secondary Administration* 2
 - or
 - 5700:695 Field Experience for Supervisors* 2
 - 5700:706 Collective Bargaining and Employee Relations* 2
 - 5700:707 The Superintendency* 3
 - 5700:895 Field Experience: The Superintendency** 2

Administrative Specialist: Pupil Personnel Administration

- Foundation Studies — nine credits.*
- Required courses:
 - 5600:631 Elementary Counseling** 3
 - or
 - 5600:633 Secondary Counseling** 3
 - 5600:645 Group Testing** 3
 - 5600:659 Organization and Administration of Guidance Services** 3
 - 5700:601 Principles of Educational Administration* 3
 - 5700:603 Administration of Educational Personnel* 2
 - 5700:606 Evaluation in Educational Organizations* 3
 - 5700:607 School Law* 2
 - 5700:608 School Finance and Economics* 3
 - 5700:613 Administration of Pupil Services** 2
 - 5700:615 Computer Applications in Educational Administration* 2
 - 5700:684 Field Experience I: Elementary Administration* 2
 - or
 - 5700:686 Field Experience I: Secondary Administration* 2
 - or
 - 5700:695 Field Experience for Supervisors* 2
 - 5700:706 Collective Bargaining and Employee Relations* 2
 - 5700:707 The Superintendency* 3
 - 5700:895 Field Experience: The Superintendency** 2

Assistant Superintendent/Superintendent Programs

There is significant overlap in the requirements of these two programs. A person entering the assistant superintendent program must already have an administrator or supervisor certificate. Both teaching and administrative experience is required for superintendent certification.

Assistant Superintendent

- Foundation Studies — nine credits.
- Required courses — master's:
 - 5700:601 Principles of Educational Administration 3
 - 5700:606 Evaluation in Educational Organizations 3
 - 5700:607 School Law 2
 - 5700:608 School Finance and Economics 3
 - 5700:609 Principles of Curriculum Development 3
 - 5600:610 Principles of Educational Supervision 3
 - 5700:613 Administration of Pupil Services 2
 - 5700:615 Computer Applications in Educational Administration 2
 - 5700:707 The Superintendency 3

- Required courses — post-master's:
 - 5700:602 School Business Administration 2
 - 5700:603 Administration of Educational Personnel 2
 - 5700:604 School-Community Relations 3
 - 5700:612 Administration of Educational Facilities 2
 - 5700:706 Collective Bargaining and Employee Relations 2
 - 5700:895 Two field experiences are required 4-5

Superintendent

- All of the assistant superintendent requirements plus
 - 5700:704 Advanced Principles of Educational Administration 2
- Electives, as needed, to bring the program to a total of 60 graduate semester hours.

Supervisor

- Foundation Studies — nine credits.
- Major field:
 - 5200:630 Elementary School Curriculum and Instruction§ 2
 - 5200:732 Supervision of Instruction in the Elementary School§ 2
 - 5300:619 Secondary School Curriculum and Instruction§§ 2
 - 5300:721 Supervision of Instruction in the Secondary School§§ 2
 - 5610:601 Seminar: Special Education Curriculum Planning§§§ 3
 - 5610:602 Supervision of Instruction: Special Education§§§ 3
 - 5700:609 Principles of Curriculum Development 3
 - 5700:610 Principles of Educational Supervision 3
 - 5700:695 Field Experience of Supervisors 2

Administrative Specialist: School and Community Relations

- Foundation Studies — nine credits.*
- Required courses:
 - 5700:601 Principles of Educational Administration* 3
 - 5700:603 Administration of Educational Personnel* 2
 - 5700:604 School-Community Relations** 3
 - 5700:606 Evaluation in Educational Organizations* 3
 - 5700:607 School Law* 2
 - 5700:608 School Finance and Economics* 3
 - 5700:615 Computer Applications in Educational Administration* 2
 - 5700:620 Secondary Administration** 3
 - 5700:631 Elementary Administration** 3

§Required only of an elementary student.
 §§Required only of a secondary student.
 §§§Required only of a special education student.

- With the approval of the adviser, the student will select at least one of the following courses and others which may include up to six pertinent electives from course offerings outside the College of Education:

5100:701	History of Education in American Society	3
5100:741	Statistics in Education	3
5700:698	Master's Problem*	2
5700:740	Theories of Supervision	3

Educational Foundations

This program area is designed for either the student interested in improving present educational skills or the student interested in educational or instructional positions in business, industry and social services.

A student's program of study will be determined jointly by the student and an academic adviser. Emphasis can range from advanced instructional technology to traditional studies in educational psychology or the social/philosophical aspects of education. A thesis or problem paper is required.

- Foundation Studies — College Core Foundation Studies.
- Departmental requirements:***

The student will earn a minimum of 15 credits excluding thesis or problem paper, within the Department of Educational Foundations. These credits will be distributed between the social foundations, psychological studies, and evaluation and research with a minimum of nine credits from one of these areas and six credits from the other (college requirements may be included).

Elementary Education

Bilingual Multicultural Education

The major purpose of this program is to provide education majors with the knowledge, skills and attitudes necessary to teach bilingual students.

Students may become certified in bilingual multicultural education at either the undergraduate or graduate level. The certification requires that a person also become certified in *one* of the following areas: elementary education, secondary education, special education or physical education.

At the end of the program, the student must demonstrate proficiency in English and a language other than English in order to meet the certification requirements of the Ohio State Department of Education.

Graduate students wishing a master's degree in addition to bilingual multicultural certification may earn a master's degree in multicultural education by taking additional course work.

The program incorporates course work in the history and philosophy of bilingual multicultural education; linguistics; English as a second language instruction; culture and theories; and practices for teaching bilingual students language arts, reading, mathematics, social studies and science.

- Program requirements:

3300:589	Seminar in English: Introduction to Bilingual Linguistics	3
5630:582	Characteristics of Culturally Different Youth	3
5630:584	Principles of Bilingual Multicultural Education	3
5630:587	Techniques for Teaching English as a Second Language in the Bilingual Classroom	4
	Field experience in bilingual classrooms/settings	3

- Select one of the following:

5630:585	Teaching Reading and Language Arts to Bilingual Students	4
5630:586	Teaching Mathematics, Social Studies and Science to Bilingual Students	3

Multicultural Education

The purpose of this program is to provide knowledge, skills and attitudes which will enable the educator to design and implement programs that promote the concept of cultural pluralism. Special attention is given to educational programming for the culturally different learner.

- Required Courses:

5100:640	Techniques of Research	3
5300:780	Seminar in Secondary Education*	4
5600:645	Group Testing in Counseling	3
5630:581	Multicultural Education in the United States	3
5630:582	Characteristics of Culturally Different Youth	3
5630:686	Seminar: Education of the Culturally Different	2

- Electives in related special fields — 17 credits.

Elementary Education

Those students seeking a master's degree in elementary education can follow a 30-semester credit program which includes a master's problem (two credits) or follow another option, which calls for the completion of 36 credits with a

field experience, but no master's problem. For additional information about the option, a student should contact the department head.

- Foundation Studies — nine credits.

- Elementary education:

5200:630	Elementary School Curriculum and Instruction	2
5200:698	Master's Problem	2
5200:780	Seminar in Elementary Education*	4-8

- Electives — 9-13 credits.

Electives may be any combination of courses to meet the minimum of 30 credits which may include up to 12 credits in pertinent course offerings outside the College of Education.

This program is primarily for the student who expects to progress as a teacher in elementary schools.

Middle School Education

For elementary and secondary certified teachers, these courses comprise a major area of study within the master's programs in the elementary and secondary education departments. They deal with the middle-grade learner, curriculum and programs. The student should seek advisement within the appropriate department for other requirements peculiar to the elementary and secondary programs.

- Required courses:

5100:604	Cultural Foundations of Education	3
5100:624	Psychology of Early Adolescence	3
5200:780	Curriculum Development in Middle School	2
5300:625	Reading Programs in Secondary School	3
5300:780	Philosophy and Organization of Middle School	2
5600:526	Career Education/Guidance in Middle School	2

Reading

The master's degree is designed for teachers/administrators working with the early childhood, elementary, junior high, middle, secondary content, secondary developmental, special education, and adult learner. The program of study provides opportunities to focus on those aspects of reading that relate to the professional goals and interests of the student wishing to learn more about developmental and clinical reading instruction through diagnostic-prescriptive teaching.

- Foundation Studies 9

- Reading

5200:698	Master's Problem†	2
5200:780	Seminar in Elementary Education: Children's Literature	2
5250:681	Diagnosis and Correction of Reading Problems	5
5250:682	Clinical Practices in Reading	5
5250:692	Advanced Study and Research in Reading Instruction	3
5250:693	Supervision and Curriculum Development in Reading Instruction	2

- Electives

5250:680	Trends in Reading	2
	or	
5300:780	Seminar in Secondary Education: Teaching Literature	2
	Post-Master's Degree Requirements for Ohio Certification in Reading, K-12:	
5250:511	Materials and Organizations for Reading Instruction	3
5250:540	Developmental Reading in the Content Areas — Elementary	3
5300:625	Reading Programs in Secondary Schools	3
5300:780	Seminar in Secondary Education: Teaching Literature	2
	or	
5250:680	Trends in Reading	2
	Total for Certification: 41 credits	

Physical Education and Health Education

Athletic Training for Sports Medicine

The Athletic Training program, requiring 32 credits, is designed primarily for students having an undergraduate degree in the same area. Students may become involved in supervising university undergraduates, working with athletic teams, and other clinical experience both on and off campus.

- Foundation courses:

5100:600	Philosophies of Education	3
	or	
5100:604	Topical Seminar in the Cultural Foundations of Education	3
5100:620	Behavioral Bases of Education	3
	or	
5100:624	Seminar: Educational Psychology	3
5100:640	Techniques of Research	3

*Two seminars are required.

***After accumulating 21 credits, the student will take a master's comprehensive examination.

*Two seminars are required.

†Secondary Education students would complete 5300:698 Master's Problem, 2 credits.

- Required Courses:

3100:561,2	Human Physiology	8
3100:584	Pharmacology	3
5550:541	Advanced Athletic Injury Management	4
5550:552	Therapeutic Modalities and Equipment in Sports Medicine	3
5550:605	Physiology of Muscular Activity and Exercise	3
5550:695	Field Experience: Master's (at least 2 credits if only option selected)	1-6
	or	
5550:698	Master's Problem	2-4
	or	
5550:699	Thesis Research	4-6
- Electives (determined by adviser):

3100:565	Advanced Cardiovascular Physiology	3
5550:5—	Workshops in Sports Medicine	1-3
5550:601	Administration of Health, Physical Education, Athletics and Recreation	3
5550:605	Measurement and Evaluation in Physical Education	3
5550:680	Special Topics in Health and Physical Education	2-4
5550:697	Independent Study	1-3

With the approval of an adviser, the student may select additional courses and/or workshops related to the graduate program.

Outdoor Education

The outdoor education program, requiring 32 credits, is designed for those students having an undergraduate background in elementary or secondary education, biology, environmental studies, health, physical education or recreation. Students may become involved with existing outdoor education programs in the public schools, metropolitan, state and national park programs or private and public agencies which conduct outdoor/environmental education programs.

- Foundation Studies — nine credits.
- Required courses:

5560:550	Application of Outdoor Education to the School Curriculum	4
5560:552	Methods, Materials and Resources for Teaching Outdoor Education	3
5560:556	Outdoor Pursuits	4
	or	
5560:605	Outdoor Education: Special Topics	2-4
5560:600	Outdoor Education: Rural Influences	3
5560:690	Practicum in Outdoor Education	2-4
5560:695	Field Experience (at least 2 credits if only option selected)	1-6
	or	
5560:698	Master's Problem	2-4
	or	
5560:699	Thesis Research	4-6

With the approval of the adviser, the student will select additional courses and/or workshops related to the graduate program.

Physical Education

The graduate program in physical education, requiring 30 credits, is designed for students interested in general physical education and teacher preparation. Specialized graduate programs may be designed in cooperation with the student's adviser, and the approval of the dean of the Graduate School. The program, totaling 30 credits, is designed to meet the needs of the student relative to graduate study and future employment.

- Foundation Studies — nine credits.
- Required courses:

5550:536	Adapted Physical Education for the Learning Disabled Child	2
5550:601	Administration of Health, Physical Education, Recreation and Athletics	3
5550:603	Curriculum Planning in Health and Physical Education	2
5550:605	Physiology of Muscular Activity and Exercise	2
5550:606	Measurement and Evaluation in Physical Education	3
5550:608	Supervision of Physical Education	2
5550:609	Motivational Aspects of Physical Activity	3
5550:695	Field Experience — Master's (at least 2 credits if only option selected)	1-6
	or	
5550:698	Master's Problem	2-4
	or	
5550:699	Thesis Research	4-6

With the approval of an adviser, the student may select additional courses and/or workshops related to the graduate program.

Option: Curriculum Design and Implementation

The Curriculum Design and Implementation Option, requiring a minimum of 32 credits, is designed for teachers of all age groups in physical education. It contains a balance of coursework associated with curriculum design models, implementation procedures and contemporary content.

- Educational Foundations (required) 9

- Required Major Courses: 10-17

5550:536	Adapted Physical Education Tasks for the Learning Disabled Child	2
5550:603	Curriculum Planning in Health and Physical Education	2
5550:606	Measurement and Evaluation in Physical Education	3
	or	
5550:608	Supervision of Physical Education	2
- Select one of the following:

5550:601	Administration of Health, Physical Education, Athletics, and Recreation	3
	or	
5550:609	Motivational Aspects of Physical Activity	3
	or	
5550:680	Special Topics (may be repeated to six credits with adviser's consent)	2-4
- Select at least one of the following:

5550:695	Field Experience: Master's (at least 2 credits if only option selected)	1-6
	or	
5550:698	Master's Problem	2-4
	or	
5550:699	Master's Thesis Research	4-6
- Elementary or Secondary Education (required) 2

5200:630	Elementary School Curriculum and Instruction	2
	or	
5300:619	Secondary School Curriculum and Instruction	2
- Outdoor Education (required) 8

5560:550	Application of Outdoor Education to the School Curriculum	4
5560:556	Outdoor Pursuits	4
- Additional hours to be selected from above courses to total at least 32. Electives may be taken with permission of the adviser.

Option: Exercise Physiology/Adult Fitness

This graduate program, requiring a minimum of 32 credits, is designed to prepare students for advanced study in exercise physiology and future employment in adult fitness, corporate fitness and cardiac rehabilitation programs. Special attention is also given to knowledge and practical skills necessary for students preparing for American College of Sports Medicine certifications.

- Educational Foundations (required) 9
- Required Major Courses: 21-25

3100:561	Human Physiology	4
3100:562	Human Physiology	4
5550:601	Administration of Health, Physical Education, Recreation, and Athletics	3
5550:605	Physiology of Muscular Activity and Exercise	2
5550:606	Measurement and Evaluation in Physical Education	3
5550:609	Motivational Aspects of Physical Activities	3
5550:695	Field Experience: Master's (at least 2 credits if only option selected)	1-6
	or	
5550:698	Master's Problem	2-4
	or	
5550:699	Thesis Research	4-6
- Electives — at least two credits from the following list with consent of the adviser:

3100:565	Advanced Cardiovascular Physiology	3
3100:520	Introduction to Computer Based Education	3
5100:741	Statistics in Education	3
5100:743	Advanced Educational Statistics	3
5550:5—	Workshops in Sports Medicine	1-3
5550:695	Field Experience: Master's	1-6
5550:697	Independent Study	1-3
5550:680	Special Topics in Health and Physical Education	2-4

Option: Sport Behavior

The Sport Behavior Option, requiring a minimum of 32 credits, is designed for teachers, coaches and other professionals who have responsibilities for the education of persons of all ages in the context of sport. It includes coursework which addresses theoretical concepts of sport behavior, as well as the practical applications of these concepts.

- Educational Foundations (required) 9
- Required Major Courses 12

5550:601	Administration of Health, Physical Education, Athletics and Recreation	3
5550:605	Physiology of Muscular Activity and Exercise	2
5550:606	Measurement and Evaluation in Physical Education	3
5550:609	Motivational Aspects of Physical Activity	3
5550:680	Special Topics in Health and Physical Education (may be repeated)	2-4
5550:695	Field Experience: Master's (at least 2 hours if only option selected)	1-6
	or	
5550:698	Master's Problem	2-4
	or	
5550:699	Thesis Research	4-6
- Behavior Electives — at least four credits, limited to two courses in Psychology, from the following:

3750:610	Psychology Core I: Organizational, Social and Applied	4
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3750:620	Psychology Core II: Developmental, Perceptual and Cognitive	4
3750:630	Psychology Core III: Counseling, Individual and Abnormal	4
3750:640	Psychology Core IV: Sensory, Biopsychological and Experimental	4
3850:631	Social Psychology	3
3850:632	Small Group Theory	3
3850:680	Sociology of Education	3
5100:721	Learning Processes	3
5100:741	Statistics in Education	3
5100:743	Advanced Educational Statistics	3
5550:697	Independent Study	3
5600:600	Seminar in Counseling	1
5600:610	Counseling Skills for Teachers	3
5600:620	Topical Seminar	1-4
5600:643	Counseling: Theory and Philosophy	3
5610:540	Developmental Characteristics of Exceptional Individuals	3

- Additional hours to be selected from above courses to total at least 32 credits.
- Electives may be taken with permission of the adviser.

Option: Sport Management

The Sport Management Option, requiring a minimum of 34 credits, is designed for educators and other professionals who are interested in pursuing a career in any of the various forms of sport management. It includes coursework distributed over philosophical and investigative foundations, sport administration, business management and administration. In addition, there is a concentrated practical component.

- Educational Foundations (required) 9
- Required Major Courses: 16

5550:601	Administration of Health, Physical Education, Recreation and Athletics	3
5550:605	Physiology of Muscular Activity and Exercise	2
5550:608	Supervision of Physical Education	2
5550:609	Motivational Aspects of Physical Activity	3
5550:695	Field Experience: Master's	6
- Business Administration Electives — at least three of the following courses: 9

6200:570	Governmental and Industrial Accounting	3
6200:601	Financial Accounting	3
6200:610	Accounting Management and Control	3
6200:670	Cost Concepts and Control	3
6200:699	Seminar in Accounting	3
6500:580	Introduction to Health Care Management	3
6500:683	Health Services Systems Management	3
6600:540	Product Planning	3
6600:600	Marketing Concepts	3
6600:620	Strategic Marketing Management	3
- Electives may be taken with permission of the adviser.

Secondary Education

Middle School Education

For elementary and secondary certified teachers, these courses comprise a major area of study within the master's programs in the elementary and secondary education departments. They deal with the middle-grade learner, curriculum and programs. The student should seek advisement within the appropriate department for other requirements peculiar to the elementary and secondary programs.

- Required courses:

5100:604	Cultural Foundations of Education	3
5100:624	Psychology of Early Adolescence	3
5200:780	Curriculum Development in Middle School	2
5300:625	Reading Programs in Secondary School	3
5300:780	Philosophy and Organization of Middle School	2
5600:526	Career Education/Guidance in Middle School	2

Secondary Education

This program is for middle and junior high school, high school and post-secondary school teachers. Preparation is for the master teacher, department head, supervisor and resource teacher (the physical education major should see an adviser for alternate course requirements). With minor modification, this program may also serve the holder of a baccalaureate degree who seeks a teaching certificate. For specific information on obtaining initial teacher certification through a master's program, see the department head. The degree requires a minimum of 33 semester hours of graduate work.

- Foundation Studies — nine credits.
- Secondary education course:

5300:780	Seminar in Secondary Education: Improvement of Instruction (in the area of concentration)	2
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- Ten credits from the following:

5300:619	Secondary Curriculum and Instruction	2
5300:625	Reading Programs in Secondary Education	3
5300:695	Field Experience	1-6
5300:698	Master's Problem	2-4
	or	
5300:699	Thesis Research	4-6
5300:721	Supervision of Instruction	2

5300:780	Seminar: Secondary Education*	2
	Topics: Senior High	
	Middle and Junior High School	
	Computer-Based Education	
	Individualized Instruction	
5400:505	Occupational Education for Youth and Adults	3

- Area of concentration (500 level or above) — 10 credits

Course selections are made by student and adviser in accord with the student's professional interests. Possible areas of concentration include:

Subject Matter Specialist (mathematics, English, etc.)
Middle school education
Economic education
Micro-computer applications

- Electives — two to four credits.
- A comprehensive examination is required.

Technical Education

The major objective of the technical education program is to prepare the instructor and other educational personnel for post-secondary educational institutions, industry and public and private agencies engaged in the education and training of technicians and middle-level workers. The major requires completion of 32 credits.

Program

- Foundation Studies — nine credits.
- Professional technical education courses:

5400:510	The Two-Year College	3
	or	
5400:505	Occupational Education for Youth and Adults	3
5400:521	Instructional Techniques in Technical Education	4
5400:530	Course Construction in Technical Education	2
- Teaching internship:

The student entering the program without teaching experience is required to take a teaching internship at a cooperating two-year institution.

5400:690	Internship: Teaching Vocational Education	2
	or	
5400:691	Internship: Teaching Technical Education	2
	or	
5400:692	Internship: Post-Secondary Education	2
- Elective credits (zero to four credits) may support the field of specialization, add to general education or be professional education courses.
- A comprehensive examination is required.

Options (Select one for a total of 8-13 credits.)

Teaching

An approved schedule of career-related courses selected from the Graduate School offerings. Course selections will be determined by the student's academic and professional background.

Guidance Option A (must be followed in sequence)

5600:643	Counseling: Theory and Philosophy	3
5600:651	Techniques of Counseling	3
5600:653	Group Counseling	4
5600:675	Practicum in Counseling I	5

Guidance Option B

5600:635	Community Counseling	3
5600:647	Career Counseling: Theory and Practice	3
5600:645	Group Testing in Counseling	3

Select one of the following:

5600:649	Counseling and Personnel Services in Higher Education	3
5600:526	Career Education	2
5600:610	Counseling Skills for Teachers	3

Curriculum and Supervision

5700:609	Principles of Curriculum Development	3
5700:610	Principles of Educational Supervision	3
	Elective in Curriculum or Supervision	2

Vocational Home Economics — Family Life (eight to nine credits)

Vocational Home Economics — Child Care and Development (Job Training Specialization) (eight to nine credits)

*Only two seminars for this option may be counted toward the degree.

College of Business Administration

Russell J. Petersen, Ph.D., *Dean*
 Kenneth E. Mast, D.B.A., *Associate Dean*
 E. Lee Wilson, M.B.A./C.M.A., *Assistant to the Dean*

MASTER'S DEGREE

The College of Business Administration (CBA) offers graduate programs which lead to the degrees of Master of Business Administration, Master of Science in Management and Master of Taxation. The University has offered programs of study in business since 1919, initially through the Department of Commerce and since 1953 through the College of Business Administration. In 1958, graduate studies in business were begun. Both the undergraduate and master's programs are accredited by the American Assembly of Collegiate Schools of Business (AACSB).

During its long tradition, the college has sought to fulfill the educational and professional needs of its 500 graduate students, the community and regional business organizations. To meet its urban objectives, the college offers most graduate courses only between 5:20 p.m. and 10:30 p.m. The master's programs are designed to serve those who work full-time and wish to pursue a master's program on a part-time basis. However, many students enroll fulltime to complete the master's program in a shorter period.

Admission

Policy

The applicant must meet one (1) of the following eligibility requirements which are in conformity with the Graduate School and the college's accrediting agency (AACSB):

- Hold a domestic baccalaureate degree from a regionally accredited college or university and have a total index score of 1,000 or more points based upon the overall undergraduate grade-point average (GPA) (A=4.0) times 200 plus the Graduate Management Admissions Test (GMAT) score.
- Hold a domestic baccalaureate degree from a regionally accredited college or university and have a total index score of 1,050 or more points based on the junior-senior (i.e., last 64 semester or 96 quarter credits) GPA (A=4.0) times 200 plus the GMAT score.
- Hold a degree from outside the United States and have an academic standing of first or high second class, satisfactory evidence of competence in English (i.e., TOEFL score of 550 or above) and a score of at least 450 on the GMAT.

Even though an applicant is eligible for consideration, an offer of admission is not guaranteed. Since staff, facilities and resources are limited, a determination must be made as to the number of applicants who can be adequately served among those eligible. As a result, offers of admission may be limited to only the most qualified of the eligible applicants as determined by the CBA Graduate Admissions Committee. The committee will consider the following in making decisions: the difficulty of the applicant's undergraduate program; the length of time and activities since graduation; the percentile ranking on the GMAT. Applicants are expected to score at least in the 55th percentile on the GMAT — approximately 480 — in order for an offer of admission to be extended.

In rare instances, the applicant who has taken the GMAT but does not meet requirements may be considered for admission. Also, those who have previously been denied admission may, upon presentation of new information, be reconsidered. In either case, the applicant must petition, in writing, the CBA Graduate Admissions Committee giving those reasons relevant to the situation which demonstrate the likelihood of success — the burden of proof is on the applicant.

Under the regulations of the Graduate School, eligible applicants who have been extended an offer of admission by the CBA Graduate Admissions Committee are recommended to the dean of the Graduate School for either "full" or "provisional" graduate status. Those admitted with the classification "provisional status" who have not attained an overall 3.00 GPA upon the completion of 12 graduate credits will be dismissed from the program.

Procedure

GMAT scores should be sent to the director of Graduate Programs in Business, College of Business Administration, The University of Akron, Akron, OH 44325 (institution code 1829). Since the GMAT test is administered world-wide only four times per year, the applicant should register for it sufficiently in advance to the filing of the graduate application, so evaluation for admission will not be delayed. GMAT registration bulletins can be obtained from the Graduate Programs in Business Office or the Educational Testing Service, Box 966-R, Princeton, NJ 08540. Those who have taken the GMAT more than five years ago are normally required to retake it.

All applications and accompanying documentation are evaluated simultaneously by the Graduate Admissions Committee (GAC). The GAC meets only four times, approximately four weeks after every GMAT date. The applicant will be informed in writing of the GAC's decision after approximately one week.

Requirements

To be awarded any master's degree from the College of Business Administration, a student must:

- Meet the time and grade-point requirements of the Graduate School.
- Complete the minimum credits in each of the degree descriptions.
- Complete all course requirements of applicable master's program.

Master of Business Administration

The Master of Business Administration program is designed to give the student a general knowledge of the functional areas of business and permit the concentration of study in one of the five following areas: accounting, finance, management, marketing or international business. Two phases of course work are required: Phase I (foundation courses) and Phase II (core courses). The program consists of 54 graduate credits. Phase I courses may be waived for those who have had previous study in the areas. Phase I and II courses can be taken concurrently provided that all prerequisites have been met.

Phase I Foundation Courses

All are required unless Phase I courses have been waived at the time of admission.

		Credits
3250:600	Foundation of Economic Analysis*	3
6200:601	Financial Accounting	3
6400:602	Managerial Finance**	3
6400:655	Government and Business	3
6500:600	Management and Production Concepts	3
6500:601	Quantitative Decision Making	3
6500:602	Computer Techniques for Management	3
6600:600	Marketing Concepts†	3

The following courses are required only for those selecting accounting as their area of concentration:

6200:301	Cost Accounting	3
6200:317	Intermediate Accounting I	4
6200:318	Intermediate Accounting II	4
6200:420	Advanced Accounting	3
6200:430	Taxation I	4
6200:440	Auditing	4
6200:603	Business Systems with Processing Applications (in lieu of 6500:602 Computer Techniques for Management)	3
6200:610	Accounting Management and Control (or 6200:460 Advanced Managerial Accounting)	3

Phase II Core Courses — Accounting Concentration

- Breadth courses:

6400:650	Administering Costs and Prices	3
6500:652	Organizational Behavior	3
6500:662	Quantitative Methods in Operations Management	3
Choose one:		
6400:674	Financial Management and Policy or	3
6600:620	Strategic Marketing Management Elective	3
	Any three nonfoundation graduate credits at the 600 level offered by the college not in the area of accounting	3

*If waived, student must select 6400:650 *Administering Costs and Prices* from the MBA Core (Breadth) courses.

**If waived, student must select 6400:674 *Financial Management and Policy* from the MBA Core (Breadth) courses.

†If waived, the student must select 6600:620 *Strategic Marketing Management* from the MBA Core (Breadth) courses.

- Concentration courses:

6200:627	Survey of Federal Taxation	3
6200:637	Advanced Accounting Theory	3
6200:640	Advanced Auditing	3
6200:655	Advanced Information Systems	3
6200:670	Cost Concepts and Control	3

- Integrative course:

6500:695	Business Strategy and Policy: Domestic and International (restricted to students graduating within two semesters)	3
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- Free electives:

	Any six credits of CBA electives (any six credits of foundation courses may be used to satisfy one, three-credit free elective requirement up to six credits of free electives)	6
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Phase II Core Courses — Finance Concentration

- Breadth courses:

6200:610	Accounting Management and Control (or alternate accounting elective as approved by the director of Graduate Programs)**	3
Choose one:		
6400:650	Administering Costs and Prices	3
	or	
6600:620	Strategic Marketing Management	3
6500:652	Organizational Behavior	3
6500:662	Quantitative Methods in Operations Management Elective	3
	Any three nonfoundation graduate credits at the 600 level offered by the CBA not in the area of finance	3

- Concentration courses:

6400:674	Financial Management and Policy	3
	Electives (three courses from the following: one of which must be 6400:633, 645, 676 or 678)	
6400:633	Management of Depository Institutions	3
6400:645	Investment Analysis	3
6400:649	Portfolio Management	3
6400:676	Management of Financial Structure	3
6400:678	Capital Budgeting	3
6400:681	International Business Finance	3
6400:690	Selected Topics in Finance (may be repeated for a total of six credits)	3
6400:697	Independent Study (may be repeated for a total of three credits)	3
6400:699	Seminar in Finance (must be repeated for a total of six credits)	3

- Integrative course:

6500:695	Business Strategy and Policy: Domestic and International (restricted to students graduating within two semesters)	3
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- Free electives:

	Any six credits of CBA electives (any six credits of foundation courses may be used to satisfy one, three-credit free elective requirement up to six credits of free electives. Electives outside the CBA must be approved by the graduate director.)	6
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Phase II Core Courses — Management Concentration

- Breadth courses:

6200:610	Accounting Management and Control (or alternate accounting elective as approved by the director of Graduate Programs)**	3
6500:662	Quantitative Methods in Operations Management	3
Choose two:		
6400:650	Administering Costs and Prices	3
	or	
6400:674	Financial Management and Policy	3
	or	
6600:620	Strategic Marketing Management Elective	3
	Any three nonfoundation graduate credits at the 600 level offered by the CBA not in the area of management	3

- Concentration courses:

6500:640	Management Information Systems	3
6500:652	Organizational Behavior	3
	Electives	
	Any six nonfoundation graduate credits in management (no more than three credits at the 500 level)	6

- Integrative course:

6500:695	Business Strategy and Policy: Domestic and International (restricted to students graduating within two semesters)	3
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- Free electives

	Any six credits of CBA electives (Any six credits of foundation courses may be used to satisfy one, three credit free elective requirement up to six credits of free electives. Electives outside the CBA must be approved by the graduate director.)	6
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Phase II Core Courses — Marketing Concentration

- Breadth courses:

6200:610	Accounting Management and Control (or alternate accounting elective as approved by the director of Graduate Programs)**	3
Choose one:		
6400:650	Administering Costs and Prices	3
	or	
6400:674	Financial Management and Policy	3
6500:652	Organizational Behavior	3
6500:662	Quantitative Methods in Operations Management Elective	3
	Any three nonfoundation graduate credits at the 600 level offered by the CBA not in Marketing	3

- Concentration courses:

6600:620	Strategic Marketing Management	3
6600:640	Marketing Information Systems and Research Elective	3
	Any six nonfoundation graduate credits in marketing (no more than three credits at the 500 level)	6

- Integrative course:

6500:695	Business Strategy and Policy: Domestic and International (restricted to students graduating within two semesters)	3
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- Free electives:

	Any six credits of CBA electives (any six credits of foundation courses may be used to satisfy one, three-credit elective up to six credits of free electives. Electives outside the CBA must be approved by the graduate director.)	6
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Phase II Core Courses — International Business Concentration*

- Breadth courses:

6200:610	Accounting Management and Control (or alternate accounting elective as approved by the director of Graduate Programs)**	3
Choose one:		
6400:650	Administering Costs and Prices	3
	or	
6400:674	Financial Management and Policy	3
6500:652	Organizational Behavior	3
6500:662	Quantitative Methods in Operations Management	3
6600:620	Strategic Marketing Management	3

- Concentration courses:

6800:605	International Business Environments†	3
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- Electives: 9 credits from the following courses, at least 2 of which must be designated "+, †"

3250:671	International Trade	3
6200:630	International Accounting (+)	3
6400:681	International Business Finance (+)	3
6500:656	Management of International Operations (+)	3
6800:630	International Marketing Policies (+)	3
6800:690	Seminar in International Business	3
6800:685	Multinational Corporations	3
6800:697	Independent Study in International Business	1-3

- Integrative course:

6500:695	Business Strategy and Policy: Domestic and International (restricted to students graduating within two semesters)	3
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- Free electives:

	Any six credits of CBA electives (any six credits of foundation courses may be used to satisfy one, three-credit free elective requirement up to six credits of free electives. Electives outside the CBA must be approved by the graduate director.)	6
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Other International Business Courses

In an effort to improve the student's understanding of international business topics, the following graduate courses are offered, in addition to the International Business Concentration degree requirements:

- | | | |
|----------|--|---|
| 6200:680 | International Accounting | 3 |
| 6500:555 | Management of Arbitration: Commercial, International and Human Resources | 3 |

*Requires reading and conversational proficiency in one language other than English.

**Students with sufficient managerial accounting background must elect another accounting course to substitute for 6200:610, and such election must be approved by the director of graduate programs in business.

†Students with sufficient international business background must elect another international course to substitute for 6800:605, and such election must be approved by the director of graduate programs in business.

**Students with sufficient managerial accounting background must elect another accounting course to substitute for 6200:610 and such election must be approached by the director of Graduate Programs in the College of Business Administration.

6500:656	Management of International Operations	3
6800:690	Seminar in International Business	3

These courses are available through the departments of accounting, finance, management and marketing. Combinations of the above courses may be selected to fulfill the requirements of an MBA degree with an international business concentration.

Master of Science in Accounting

The Master of Science in Accounting program is designed to give the student additional exposure to the functional areas of business plus an advanced concentration in accounting. However, the School of Accountancy has made the Master of Science in Accounting program inactive, and no candidates will be admitted to this program until further notice.

Master of Taxation

The Master of Taxation program is a professional degree designed to provide intensive training both for those planning to enter the field and for experienced accountants and attorneys.

The program provides a framework of conceptual, technical and professional knowledge which will assist the student in developing the expertise needed to examine and understand the many aspects of the difficult and complex tax structure. Through an integrated curriculum with emphasis on tax concepts, substantive knowledge of federal and state taxation, tax research and communication skills and tax planning, the student develops the ability to identify and solve tax problems.

The Master of Taxation curriculum is structured in two phases of course work: Phase I: foundation courses; and Phase II: required courses. A minimum of 30 semester credits is required for the degree.

Phase I

- Graduate Foundation:

3250:600	Foundation of Economic Analysis	3
6200:601	Financial Accounting	3
6200:603	Business Systems with Processing Applications	3
6200:610	Accounting Management and Control	3
6400:602	Managerial Finance	3
6400:655	Government and Business	3
6500:600	Management and Production Concepts	3
6500:601	Quantitative Decision Making	3
6600:600	Marketing Concepts	3
- Postbaccalaureate Foundation:

6200:430	Taxation I	4
6500:490	Business Policy	4

Phase II

- Required:

6200:628	Basic Tax Research	1
6200:631	Corporate Taxation I	3
6200:632	Taxation of Transactions in Property	3
6200:633	Estate and Gift Taxation	3
- Electives:

Eighteen credits of which at least 12 must be in taxation (6200:641-61):		
Taxation courses		12
Any CBA courses		6

Master of Science in Management

The Master of Science in Management program allows students to concentrate their advanced study in one of five areas: quality management, information systems management, health services management, human resource management and materials management. Because of the complex nature of these specializations, they are not normally offered as options in traditional MBA programs. They are designed for individuals who know what they want to do or to help them apply what they already know more effectively. For example, engineers, science and math undergraduate majors may choose to concentrate in quality or materials management while computer science majors may prefer information systems management. Psychology majors would benefit from the human resource management concentration, and the health services option is a natural enhancement for anyone with special interest in the health field.

The Master of Science in Management program consists of two phases of courses. Phase I courses offer a basic foundation in business (24 credits). These courses may be waived if the student has completed prior study in each area. Phase II courses (36 credits) form the core of the M.S. program, including the concentration in a specific area of study.

Phase I

- Foundation:

3250:600	Foundation of Economic Analysis	3
6200:601	Financial Accounting	3
6400:602	Managerial Finance	3
6400:655	Government and Business	3
6500:600	Management and Production Concepts*	3
6500:601	Quantitative Decision Making	3
6500:602	Computer Techniques for Management	3
6600:600	Marketing Concepts	3

Phase II

- Business Courses:

6200:610	Accounting Management and Control† (or alternate accounting elective)**	3
6400:674	Financial Management and Policy†	3
6500:663	Organizational Theory†	3
- Core Courses:

6500:640	Management Information Systems	3
6500:652	Organizational Behavior	3
6500:662	Quantitative Methods in Operations Management	3
6500:695	Business Strategy and Policy: Domestic and International	3

Options:

Choose a concentration from following:

Quality Management

- Concentration Courses:

6500:651	Productivity and Quality of Worklife Issues	3
6500:663	Applied Industrial Statistics I	3
6500:664	Applied Industrial Statistics II	3
6500:673	Quality and Productivity Techniques	3
6500:674	Advanced Quality and Productivity Techniques	3

Information Systems Management

(Cobol Proficiency is Required)

- Concentration Courses:

6500:641	Applied Data Management	3
6500:645	Advanced Management Information Systems	3
6500:672	Manufacturing and Operations Analysis	3
- Concentration Electives (Choose two):

6500:642	Systems Simulation	3
6500:643	Expert Systems in Business	3
6500:644	Managerial Decision Support Systems	3
6500:678	Project Management	3

Health Services Administration

- Concentration Courses:

6500:582	Hospital Operations Management	3
6500:683	Health Services Systems Management	3
6500:686	Health Services Research Project	3
6500:687	Graduate Seminar in Health Services Policy and Administration	3
- Concentration Elective:

Three credits as approved by the director of graduate programs in business	3
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Human Resource Management

- Concentration Courses:

6500:651	Productivity and Quality of Worklife Issues	3
6500:654	Industrial Relations	3
6500:655	Compensation Administration and Employee Benefits	3
6500:658	Strategic Human Resource Management	3
6500:660	Employment Discrimination	3

*For students selecting Health Services Management Options, 6500:600, if not waived, is to be replaced by 6500:580, Introduction to Health Care Management.

**Students with sufficient managerial accounting background must elect another accounting course to substitute for 6200:610, and such election must be approved by the director of graduate programs in business.

†For each six credits of Phase I coursework completed, three credits of Phase II coursework may be waived from the courses designated with an asterisk as determined by the director of graduate programs in business. Maximum of six credits to be waived.

Materials Management

- Concentration Courses:

6500:672	Manufacturing and Operations Analysis	3
6500:675	Materials Management	3
6500:676	Management of Production and Operations	3
- Concentration Electives (Choose two):

6500:641	Data Management	3
6500:642	Systems Simulation	3
6500:651	Productivity and Quality of Worklife Issues	3
6500:673	Quality and Productivity Techniques	3
6500:678	Project Management	3

Joint Programs

The School of Law and the College of Business Administration (CBA) offer a joint program in legal and administrative studies (J.D./M.B.A.) and a joint program in legal and taxation studies (J.D./M.Tax.). These combinations are open to the student preparing for a career in such areas as corporate law, tax accounting or legal practice in government. The amount of time required to complete a joint degree program is shorter than the time required to complete both programs independently. To pursue either cooperative program, the student must apply to and be accepted by both the School of Law and the Graduate School of the CBA. The student should contact each school independently for information covering admission criteria and procedures (for

further information on School of Law admissions, write: Director of Admissions, School of Law, The University of Akron, Akron, OH 44325). A baccalaureate degree is required.

Degree Requirements

A student is required to fulfill the requirements of the School of Law (77 credits) plus 10 credits transferred from the CBA. The requirements of the CBA may be met by fulfilling the requirements previously listed which include the common body of knowledge (Phase I) courses (unless waived because of prior undergraduate credits earned) and 24 credits for M.Tax. or 30 credits for M.B.A. of advanced courses in the CBA plus six credits transferred from the School of Law. The reciprocal acceptance of course credits by each school is the essence of the joint programs. All law courses used to fulfill CBA requirements must be approved by the director of Graduate Programs in Business prior to completion. To earn both degrees, a total of 97 (J.D./M.Tax.) or 107 (J.D./M.B.A.) credits is required, depending on the master's program pursued. More credits may be required for the master's degree if Phase I courses are required.

Upon the approval of the director of Graduate Programs in Business, 10 credits of School of Law courses may be applied toward the Masters of Taxation degree. No more than six credits from the School of Law may be in non-tax courses. The other four credits taken in the School of Law must be in tax courses which substitute for equivalent tax courses in the CBA.

College of Fine and Applied Arts

Donald E. Hall, Ph.D., *Acting Dean*
Linda Moore, Ph.D., *Associate Dean*

MASTER'S DEGREE

Home Economics and Family Ecology

A program of study is offered leading to the Master of Arts in Home Economics and Family Ecology degree with an emphasis in either family development or child development. Students must meet the following admission requirements for acceptance in the program:

- Meet the minimum GPA of 2.75 for four years of undergraduate study or 3.00 for the last two years of undergraduate study.
- Take the Graduate Record Examination within the five-year period prior to seeking admission.
- Submit a letter of personal career goals.
- Offer two letters of recommendation if desired.

The graduate faculty of the School of Home Economics may require an interview with any applicant.

In addition to the above, the student will be expected to comply with the following requirements:

- Complete the course of study in one of the two options, child development or family development, with a minimum of 40 credits. These credits will include:
 - foundation courses to prepare the student for research in home economics and family ecology as a discipline;
 - core courses in the area of specialty;
 - electives selected from within the department or from another discipline to strengthen student's professional goals. These courses will be selected in consultation with and approval from the student's graduate faculty adviser.
- Complete a thesis or an internship. The thesis option involves the design and evaluation of original research in an appropriately related area commensurate with the student's background and area of pursuit. The research may involve a creative, historical or experimental design. The internship option involves the design, development, implementation and evaluation of original and creative programs and/or resource materials pertaining to family and/or child development. Part of the internship experience may take place in a community-based agency which serves families and/or children. A written proposal for the thesis or internship option must be submitted at the completion of approximately 20 credits of graduate study.
- Pass a written comprehensive examination over major and minor areas after the completion of at least 24 credits of graduate work.
- Apply for advancement to candidacy upon successful completion of 25 credits of graduate study, the written comprehensive examination, and an approved prospectus for a thesis or internship.
- Pass an oral examination covering the thesis or internship report.

Foundation Courses

		<i>Credits</i>
7400:600	Evaluation of Home Economics Literature	3
7400:675	Conceptual Frameworks in Family Ecology	3

- One graduate-level research course to be selected with and approved by the adviser.

Suggested courses include:

3850:604	Social Research Design	3
3980:600	Basic Analytical Research	3
5100:640	Techniques of Research	3

- Internship or Thesis (select one):

7400:695	Internship – student must have 7400:395	5
7400:699	Community Involvement or equivalent Thesis	5

Child Development Option

- Core courses:

7400:605	Developmental Parent-Child Interactions	3
7400:665	Development in Infancy and Early Childhood	3

- Option Electives:

Select 12 credits from the following courses with approval of adviser: (If a course has been taken at the undergraduate level, other courses must be selected.)

7400:501	Family-Life Patterns in the Economically Deprived Home	2
7400:504	Adolescence in the Family Context	3
7400:542	Human Sexuality	3
7400:545	Public Policy and the American Family	3
7400:548	Before and After School Child Care	2
7400:560	Organization and Supervision of Child-Care Centers	3
7400:596	Parenting Skills	3
7400:610	Child Development Theories	3
7400:616	Infant and Child Nutrition	2
7400:660	Programming for Child Care Centers	2

- Cognate Electives:

Select 8 credits with approval of adviser from courses within the School of Home Economics and Family Ecology OR from a cognate area outside the School of Home Economics and Family Ecology OR from a combination of the above.

- Internship or Thesis (Select one):

7400:695	Internship	5
7400:699	Thesis	5
	Total	40

Child Life Option

- Foundation courses:

7400:600	Evaluation of Home Economics Literature	3
7400:675	Conceptual Frameworks in Family Ecology	3

- Core Courses:

7400:551	Child in the Hospital	4
7400:555	Practicum: Establishing and Supervising a Child Life Program	3
7400:585	Orientation to the Hospital Setting	2

- Option Electives:

Select 10 credits with approval of adviser from among the following: (If a course has been taken at the undergraduate level, other courses must be selected.)

7400:501	Family-Life Patterns in the Economically Deprived Home	2
7400:504	Adolescence in the Family Context	3
7400:542	Human Sexuality	3
7400:560	Organization and Supervision of Child-Care Centers	3
7400:596	Parenting Skills	3
7400:605	Developmental Parent-Child Interactions	3
7400:610	Child Development Theories	3
7400:616	Infant and Child Nutrition	2
7400:660	Programming for Child-Care Centers	2
7400:665	Development in Infancy and Early Childhood	3
	Research course selected with approval of adviser	3

- Cognate Electives:

Select 10 credits with approval of adviser from courses within the School of Home Economics and Family Ecology OR from a cognate area outside the school OR from a combination of the above.

- Internship or Thesis (Select One):

7400:695	Internship	5
7400:699	Thesis	5
	Total	40

Clothing, Textiles and Interiors Option

- Foundation Courses:

7400:600	Evaluation of Home Economics Literature	3
7400:675	Conceptual Frameworks in Family Ecology	3
	and	
	Research course selected with approval of adviser	3
	Total	9

- Option Electives:

Select 18 credits with approval of adviser from among the following: (If a course has been taken at the undergraduate level, other courses must be selected.)

7400:531	History of Textiles and Furnishings	3
7400:532	Interiors, Textiles and Product Analysis	3
7400:536	Textile Conservation	3
7400:533	Residential Design	3
7400:534	Commercial Design	3
7400:535	Principles and Practices of Design	3
7400:539	Fashion Analysis	3
7400:523	Professional Image Analysis	3
7400:631	Problems in Design	1-3
	(May be taken twice for a maximum of 6 credits)	
7400:632	American Costume and Textile Heritage	3
7400:677	Social Psychology of Dress and the Near Environment	3
7400:696	Individual Investigation in Home Economics and Family Ecology	1-5

- Cognate Electives:

Select 8 credits with approval of adviser from courses within the School of Home Economics and Family Ecology OR from a cognate area outside the school OR from a combination of the above.

- Internship/Thesis Master's Project (Select one):

7400:694	Master's Project	5
7400:695	Internship	5
7400:699	Thesis	5
	Total	40

Family Development Option

- Foundation courses:

7400:600	Evaluation of Home Economics Literature	3
7400:675	Conceptual Frameworks in Family Ecology and Research course selected with approval of adviser	3
- Core Courses:

7400:607	Family Dynamics	3
7400:651	Family and Consumer Law	3
- Option Electives:

Select 12 credits from the following courses with approval of adviser: (If a course has been taken at the undergraduate level, other courses must be selected.)

7400:501	Family-Life Patterns in the Economically Deprived Home	2
7400:504	Adolescence in the Family Context	3
7400:506	Family Financial Management	3
7400:540	Family Crisis	3
7400:542	Human Sexuality	3
7400:545	Public Policy and the American Family	3
7400:546	Culture, Ethnicity and the Family	3
7400:596	Parenting Skills	3
7400:602	Family in Life-Span Perspective	2
7400:603	Family: Middle and Later Years	2
7400:605	Developmental Parent-Child Interactions	3
- Cognate Electives:

Select 8 credits with the approval of adviser from within the School of Home Economics and Family Ecology OR from a Cognate Area outside the School OR a combination of the above.
- Internship or Thesis (Select one):

7400:695	Internship	5
7400:699	Thesis	5
	Total	40

Food Science Option

- Foundation Courses:

7600:600	Evaluation of Home Economics Literature	3
7400:675	Conceptual Frameworks in Family Ecology and Research course selected with approval of adviser	3
	Total	9
- Core Courses:

7400:575	Analysis of Food	3
7400:576	Developments in Food Science	3
7400:520	Experimental Foods (If taken at the undergraduate level, choose 3 additional credits from option electives.)	3
	Total	9
- Option Electives:

Select 9-12 credit hours with the approval of adviser from among the following: (If a course has been taken at the undergraduate level, other courses must be selected from among option electives.)

3100:500	Food Plants	2
3250:540	Special Topics: Economics/World Food Problems	4
7400:574	Cultural Dimensions of Food	3
7400:585	Seminar in Home Economics and Family Ecology: Topics in Food Science	2-3
7400:570	The Food Industry: Analysis and Field Study	3
7400:503	Advanced Food Preparation	3
7400:524	Nutrition in the Life Cycle	3
7400:624	Advanced Human Nutrition I	3
7400:625	Advanced Human Nutrition II	3
- Cognate Electives:

Select 5-8 credits with approval of adviser from the School of Home Economics and Family Ecology OR from a cognate area outside the school OR from a combination of the above.
- Internship/Thesis (Select one):

7400:695	Internship	5
7400:699	Thesis	5
	Total	40

Nutrition/Dietetics Option

- Foundation Courses:

7400:600	Evaluation of Home Economics Literature	3
7400:675	Conceptual Frameworks in Family Ecology and Research course selected with approval of adviser	3
- Core Courses:

7400:624	Advanced Human Nutrition I	3
7400:625	Advanced Human Nutrition II	3
- Option Electives:

Select 9-12 credit hours with approval of adviser from the following: (If a course has been taken at the undergraduate level, other courses must be selected.)

3100:584	Pharmacology	3
3100:561	Human Physiology	4
3100:562	Human Physiology	4

3150:501	Biochemistry Lecture I	3
3150:502	Biochemistry Lecture II	3
3850:678	Social Gerontology	3
5600:651	Techniques of Counseling	3
6500:600	Management and Production Concepts	3
6500:602	Computer Techniques for Management	3
7400:520	Experimental Foods	3
7400:524	Nutrition in the Life Cycle	3
7400:574	Cultural Dimensions of Foods	3
7400:575	Analysis of Food	3
7400:576	Developments in Food Science	3
7400:580	Community Nutrition I	3
7400:582	Community Nutrition II	3
7400:587	Sports Nutrition	3
7400:640	Nutrition in Diminished Health	3
7410:588	Practicum Dietetics	3

• Cognate Electives:

Select 8-11 credits with approval of adviser from courses within the School of Home Economics and Family Ecology OR from a cognate area OR from a combination of the above.

• Internship/Thesis/Master's Project (Select one):

7400:694	Master's Project	5
7400:699	Thesis	5
	Total	40

Music

The degree Master of Music is offered by the School of Music with options in music education, performance, composition, theory, music history and literature, and accompanying. Entrance requirements for each program are as follows:

- The standard requirements for an undergraduate major in the area of proposed graduate specialty or performance which the school director approves as equivalent to an undergraduate major.
- The Graduate School's requirements for admission.
- The performance and accompanying options require an audition on the student's major instrument/voice. Please contact the coordinator of Graduate Studies for an audition time.
- For the composition option, compositions representing the applicant's techniques are required.
- The options in music education, music theory, and music history and literature require an interview with the coordinator of Graduate Studies and faculty in the appropriate area.

The student should consult with the coordinator of Graduate Studies in Music for additional information regarding the individualized nature of each option.

For the performance option in voice, a proficiency equal to two semesters each of Italian, German and French are required for completion of the Master of Music Degree in Voice Performance. If the student lacks background in any of these languages, auditing of undergraduate courses is required.

After completion of all course work, the student must pass an examination covering the graduate program. This examination is individualized for each candidate's unique program.

Composition Option

• Music core courses — eight credits (to be selected):

7500:555	Advanced Conducting: Instrumental	2
7500:556	Advanced Conducting: Choral	2
7500:615	Musical Styles and Analysis I (Chant through Palestrina)	2
7500:616	Musical Styles and Analysis II (Baroque through early Beethoven)	2
7500:617	Musical Styles and Analysis III (Late Beethoven through Mahler/Strauss)	2
7500:619	Theory Pedagogy	2

• Major required courses — 21-23 credits:

7500:601	Choral Literature	2
7500:618	Musical Styles and Analysis IV (20th Century)	2
7500:624	Historical Survey: Music of the 20th Century	2
7500:647	Master's Chamber Recital	1
7500:699	Thesis Research/Recital Document	4-6
7510:6--	Ensemble (participation in two ensembles required)	2
7520:642	Applied Composition	8

• Additional music courses — zero to two credits.

Graduate-level (music) courses, workshops, applied lessons (other than in composition) and/or advanced problems to be selected by the student and adviser.

• Electives — three credits.

To be selected by student and adviser. Areas include graduate-level courses in other disciplines, such as theatre arts, in which the student obtains permission of instructor, or 7520:642 *Applied Composition*.

Degree total: 34-36 credits.

Music Education Option

Thesis Option — 32 credits

- Required Music Education Core Courses — 13-15 credits

7500:611	Foundations of Music Education	3
7500:612	Practices and Trends in Music Education	3
7500:614	Measurement and Evaluation in Music Education	3
7500:699	Thesis	4-6
- Additional music/education courses — select 17-19 credits with approval of music education and graduate advisors

7500:697	Advanced Problems in Music Education	2-8
Topics may include: General Music; Kodaly Principles & Techniques; Children's Choirs; Psychology of Music; Self-Esteem in Music; Music Learning; Arranging; Choral Literature; Choral Methods; Instrumental Methods and Techniques; and Conducting.		
7500:590	Music Workshops	2-6
7520:5--/6--	Applied Music	2-6
7510:6--	Ensemble	1-2
7500:615/618	Musical Styles and Analysis	2-4
7500:621/624	Music History Survey	2-4
5100:6--/7--	Educational Foundations	2-4
5200:6--/7--	Elementary Education	
5300:6--/700	Secondary Education	

Non-Thesis Option — 34 credits

- Required Music Education Core Courses — 9 credits

7500:611	Foundations of Music Education	3
7500:612	Practices and Trends in Music Education	3
7500:614	Measurement and Evaluation in Music Education	3
- Additional music/education courses — select 25 credits with approval of music education and graduate advisors

7500:697	Advanced Problems in Music Education	2-8
Topics may include: general music; Kodaly Principles & Techniques; Children's Choirs; Psychology of Music; Self-Esteem in Music; Music Learning; Arranging; Choral Literature; Choral Methods; Instrumental Methods and Techniques; and Conducting.		
7500:590	Music Workshops	2-6
7520:5--/6--	Applied Music	2-6
7510:6--	Ensemble	1-2
7500:615/618	Musical Styles and Analysis	2-4
7500:621/624	Music History Survey	2-4
5100:6--/7--	Educational Foundations	2-4
5200:6--/7--	Elementary Education	
5300:6--/700	Secondary Education	

Music History and Literature Option

- Music core courses — eight credits (to be selected):

7500:555	Advanced Conducting: Instrumental	2
7500:556	Advanced Conducting: Choral	2
7500:618	Musical Styles and Analysis IV (20th Century)	2
7510:6--	Ensemble (participation required in two ensembles)	2
7500:697	Advanced Problems in Music	4
 - Major required courses — 20-22 credits:

7500:551	Introduction to Musicology	2
7500:553	Bibliography and Research	2
7500:621	Historical Survey: Music of the Middle Ages and Renaissance	2
7500:622	Historical Survey: Music of the Baroque	2
7500:623	Historical Survey: Music of the Classic and Romantic Eras	2
7500:624	Historical Survey: Music of the 20th Century	2
7500:697	Advanced Problems in Music	4
7500:699	Thesis Research/Recital Document	4-6
 - Additional music courses — two to four credits.
 - Graduate-level (music) workshops, applied music and/or courses to be selected by the student and adviser.
 - A minimum reading proficiency in German is required. If a student lacks background in this language, completion of undergraduate courses is required.
 - Electives — two to four credits.
To be selected by the student and adviser. Areas include graduate-level courses in other disciplines in which student obtains permission of instructor.
- Degree Total: 34-36 credits.

Performance Option in Accompanying

- Music core courses — Eight credits (to be selected):

7500:555	Advanced Conducting: Instrumental	2
7500:556	Advanced Conducting: Choral	2
7500:615	Musical Styles and Analysis I (Chant through Palestrina)	2
7500:616	Musical Styles and Analysis II (Baroque through early Beethoven)	2
7500:617	Musical Styles and Analysis III (Late Beethoven through Mahler/Strauss)	2
7500:618	Musical Styles and Analysis IV (20th Century)	2
7500:621	Historical Survey: Music of the Middle Ages and Renaissance	2
7500:622	Historical Survey: Music of the Baroque	2
7500:623	Historical Survey: Music of the Classic and Romantic Eras	2
7500:624	Historical Survey: Music of the 20th Century	2

- Major required courses — 23-26 credits:

Select either 7500:562 or 7500:633		
7500:562	Repertoire and Pedagogy: Organ	3
or		
7500:633	Teaching and Literature: Piano and Harpsichord	2
7500:640	Advanced Accompanying I	1
7500:641	Advanced Accompanying II	1
7500:642	Advanced Accompanying III	1
7500:643	Advanced Accompanying IV	1
7500:666	Advanced Song Literature	3
7500:698	Graduate Recital (to be completed in a minimum of two performance media)	2
7510:614	Keyboard Ensemble (participation in two ensembles required)**	2-4
7510:618	Small Ensemble - Mixed	2
7520:6--	Applied Music (piano, organ and/or harpsichord)	8
 - Additional music courses — two to three credits.
Graduate-level (music) courses, advanced problems, workshops and/or applied lessons, to be selected by the student and adviser.
 - Elective — two credits.
Areas may include graduate-level courses in other disciplines, such as theatre arts, for which the student obtains permission of instructor, or additional music courses, as determined by the student and adviser.
- Degree total: 33-36 credits.

Note: A minimum pronunciation proficiency is required in Italian, German and French. If the student lacks background in any of these language requirements, completion of undergraduate courses is required.

All candidates for this degree must accompany a minimum of three solo ensemble recitals (instrumental and vocal). These can be done as part of 7500:697.

Performance Option in Winds, String and Percussion

- Music core courses: eight credits (to be selected):

7500:555	Advanced Conducting: Instrumental	2
7500:556	Advanced Conducting: Choral	2
7500:615	Musical Styles and Analysis I (Chant through Palestrina)	2
7500:616	Musical Styles and Analysis II (Baroque through early Beethoven)	2
7500:617	Musical Styles and Analysis III (Late Beethoven through Mahler/Strauss)	2
7500:621	Historical Survey: Music of the Middle Ages and Renaissance	2
7500:622	Historical Survey: Music of the Baroque	2
7500:623	Historical Survey: Music of the Classic and Romantic Eras	2
7500:624	Historical Survey: Music of the 20th Century	2
 - Major required courses — 16-18 credits:

7500:618	Musical Styles and Analysis IV (20th Century)	2
7510:6--	Ensemble (participation in two ensembles required)**	2-4
7520:6--	Applied Music (select appropriate instrument)	8
 - Select one of the following as appropriate to major instrument:

7500:630	Teaching and Literature: Brass Instruments	2
7500:631	Teaching and Literature: Woodwind Instruments	2
7500:632	Teaching and Literature: Percussion Instruments	2
7500:634	Teaching and Literature: String Instruments	2
 - 7500:698 Graduate Recital 6
 - Additional music courses — six credits.*
Graduate-level (music) workshops, applied lessons, advanced problems and/or courses to be selected by student and adviser.
 - Electives — four credits.*
Areas may include graduate-level courses in other disciplines, such as theatre arts, in which the student obtains permission of instructor, or additional music courses, as determined by the student and adviser.
- Degree total: 34-36 credits.
- Note: No more than a total of 16 credits of 7520 courses may be applied to the degree.

Performance Option in Voice

- Music core courses: eight credits (to be selected):

7500:555	Advanced Conducting: Instrumental	2
7500:556	Advanced Conducting: Choral	2
7500:615	Musical Styles and Analysis I (Chant through Palestrina)	2
7500:616	Musical Styles and Analysis II (Baroque through early Beethoven)	2
7500:617	Musical Styles and Analysis III (Late Beethoven through Mahler/Strauss)	2
7500:621	Historical Survey: Music of the Middle Ages and Renaissance	2
7500:622	Historical Survey: Music of the Baroque	2
7500:623	Historical Survey: Music of the Classic and Romantic Eras	2
7500:624	Historical Survey: Music of the 20th Century	2

**Two semesters ensemble participation required for degrees completed in two semesters. Four semesters ensemble participation required for degrees completed in four semesters.

*It is recommended that each student's graduate committee recommend the appropriate elective credits.

- Major required courses — 20-22 credits:

7500:618	Musical Styles and Analysis IV (20th Century)	2
7500:665	Vocal Pedagogy	3
7500:666	Advanced Song Literature	3
7500:698	Graduate Recital	2
7510:6--	Ensemble (participation in two ensembles required)**	2-4
7520:624	Applied Voice	8

- Additional music courses — two credits (suggested minimum).
Graduate-level (music) courses, workshops, advanced problems and/or applied lessons, to be selected by student and adviser.

- Electives — four credits.
Areas may include graduate-level courses in other disciplines, such as theatre arts, in which the student obtains permission of instructor, or additional music courses, as determined by the student and adviser.

Degree total: 34-36 credits.

Performance Option in Keyboard

- Music core courses: eight credits (to be selected):

7500:555	Advanced Conducting: Instrumental	2
7500:556	Advanced Conducting: Choral	2
7500:615	Musical Styles and Analysis I (Chant through Palestrina)	2
7500:616	Musical Styles and Analysis II (Baroque through early Beethoven)	2
7500:617	Musical Styles and Analysis III (Late Beethoven through Mahler/Strauss)	2
7500:621	Historical Survey: Music of the Middle Ages and Renaissance	2
7500:622	Historical Survey: Music of the Baroque	2
7500:623	Historical Survey: Music of the Classic and Romantic Eras	2
7500:624	Historical Survey: Music of the 20th Century	2

- Major required courses — 18-21 credits:

7500:618	Musical Styles and Analysis IV (20th Century)	2
Select either 7500:562 or 7500:633		
7500:562	Repertoire and Pedagogy: Organ	3
or		
7500:633	Teaching and Literature: Piano and Harpsichord	2
7500:697	Advanced Problems in Music	2
7500:698	Graduate Recital	2
7510:614	Keyboard Ensemble (participation in two ensembles required)**	2-4
7520:6--	Applied Music (piano, organ and/or harpsichord)	8

- Additional music courses — three to four credits.
Graduate-level (music) courses, advanced problems, workshops and/or applied lessons, to be selected by the student and adviser.

- Electives — four credits.
Areas may include graduate-level courses in other disciplines, such as theatre arts, for which the student obtains permission of instructor, or additional music courses, as determined by the student and adviser.

Degree total: 34-36 credits.

Theory Option

- Music core courses — six credits (to be selected):

7500:553	Bibliography and Research	2
7500:555	Advanced Conducting: Instrumental	2
7500:556	Advanced Conducting: Choral	2
7500:621	Historical Survey: Music of the Middle Ages and Renaissance	2
7500:622	Historical Survey: Music of the Baroque	2
7500:623	Historical Survey: Music of the Classic and Romantic Eras	2
7500:624	Historical Survey: Music of the 20th Century	2

- Major required courses — 26-28 credits:

7500:615	Musical Styles and Analysis I (Chant through Palestrina)	2
7500:616	Musical Styles and Analysis II (Baroque through early Beethoven)	2
7500:617	Musical Styles and Analysis III (Late Beethoven through Mahler/Strauss)	2
7500:618	Musical Styles and Analysis IV (20th Century)	2
7500:619	Theory Pedagogy	2
7500:697	Advanced Problems in Music	8
7500:699	Thesis Research/Recital Document	4-6
7510:6--	Ensemble (participation in two ensembles required)	2
7520:642	Applied Composition	2

- Additional music courses — zero to two credits.
Graduate-level (music) workshops, applied music (other than composition), advanced problems, and/or courses to be selected by student and adviser.

- Electives — zero to two credits.
To be selected by student and adviser. Areas include graduate-level courses in other disciplines in which student obtains permission of instructor or 7520:642 *Applied Composition*.

Degree total: 34-36 credits.

Communication

The School of Communication offers the master of arts degree in a coordinated program of communication arts.

Entrance requirements:

- Meet the general requirements for admission to the Graduate School.
- Possess an undergraduate major in communication, journalism or a related field; or, complete at least 15 semester credits of undergraduate communication coursework approved by the department.

Program requirements:

- Complete 32 credits, distributed as follows:

School core courses — 16 credits:		
7600:600	Introduction to Graduate Study in Mass Media-Communication	6
7600:603	Empirical Research in Mass Media-Communication	3
7600:624	Survey of Communication Theory	3
or		
7600:625	Theories of Mass Communication	3
7600:670	Communication Criticism	4

School coursework — 10 credits.
Graduate electives — six credits.

- Complete a qualifying exam over 24 credits of coursework.
- Be advanced to candidacy.
- Register for at least four credits for thesis/project/production (may only be done after successful completion of qualifying exam).
- Present and defend a thesis/project/or production:

The requirement is designed to be the culmination of the student's academic program and involves the conception, design and execution of an academic problem in a manner which requires a high level of substantive, methodological and writing skills. These skills may be demonstrated in any of three types of activity, depending on the student's background and orientation.

Theatre Arts

The following will qualify the student in the field of theatre.

- Complete the general requirements for admission to the Graduate School.
- Complete an undergraduate major in the area of proposed graduate work or equivalent work as approved by the coordinator of the graduate theatre program.

Theatre Option

- Complete a minimum of 36 credits from one of the following courses of study.

Acting/Directing Course of Study

7800:600	Introduction to Graduate Studies	3
7800:638	Lighting Design	3
or		
7800:661	Seminar in Stage Costume Design	3
7800:641	Problems in Directing	3
7800:645	Seminar in Dramatic Literature	3
7800:646	Graduate Acting Techniques	3
7800:647	Graduate Acting Styles	3
7800:658	History of Theatre	3
7800:662	Seminar in Scene Design	3
7800:699	Research or Creative Thesis	6
	General Theatre Electives	9

Design/Technology Course of Study

7800:600	Introduction to Graduate Studies	3
7800:638	Advanced Problems in Lighting	3
7800:641	Problems in Direction	3
or		
7800:646	Graduate Acting Techniques	3
7800:638	Advanced Problems in Lighting	3
7800:641	Problems in Direction	3
or		
7800:646	Graduate Acting Techniques	3
7800:645	Seminar in Dramatic Literature	3
7800:658	History of Theatre	3
7800:660	Advanced Technical Theatre	3
7800:661	Seminar in Stage Costume Design	3
7800:662	Seminar in Scene Design	3
7800:699	Research or Creative Thesis	6
	General Theatre Electives	6

General M.A. Course of Study - History, Literature, Criticism

7800:567	Contemporary Theatre Styles	3
7800:600	Introduction to Graduate Studies	3
7800:641	Problems in Directing	3
or		
7800:662	Seminar in Scene Design	3
7800:645	Seminar in Dramatic Literature	3
7800:655	Dramatic Theory and Criticism	3
7800:658	History of Theatre	3
7800:663	Seminar in American Theatre	3
7800:699	Research or Creative Thesis	6
	Graduate Theatre Electives	9

**Two semesters ensemble participation required for degrees completed in two semesters. Four semesters ensemble participation required for degrees completed in four semesters.

- Complete an oral defense of the thesis or production.

Arts Management Option

- Complete a minimum of 42 credits.
- Required theatre courses:

7800:600	Introduction to Graduate Studies in Theatre Arts	3
7800:605	Colloquium in the Arts	2
7800:665	Audience Development	3
7800:666	Principles of Arts Management	3
7800:682	Fund Raising and Grantsmanship in the Arts	3
7800:691	Arts Administration Practices and Policies	3
7800:692	Legal Aspects of the Arts	2
7800:698	Internship	3-6
7800:699	Research or Creative Thesis	3-6
- Electives in business: (may not exceed 15 credits)

6200:570	Government and Institutional Accounting*	
6500:600	Management Concepts, Practices and Theory	3
6600:600	Marketing Concepts	3
- Related fields:

Options here include course work in business computer science, urban studies, and music.
- Complete an oral defense of the thesis.
- General Electives 1-4

Communicative Disorders

This program, leading to the M.A. in communicative disorders, is designed to lead to professional certification by the American Speech-Language-Hearing Association (ASHA) in speech language pathology and/or audiology and/or licensure by the State of Ohio Board of Speech Pathology and Audiology. To enter the program:

- Complete requirements for admission to the Graduate School.
- Hold an undergraduate major in the area of proposed graduate specialty or complete undergraduate work within one calendar year of application.
- Complete department requirements for admission which include submission of three letters of recommendation and Graduate Record Examination Aptitude Test results.
- Declare intent to major in either speech language pathology or audiology.

Speech language pathology and audiology majors are accepted upon meeting requirements. Deadline for assistantship applications is March 1.

*See prerequisite for Accounting.

Degree Requirements

- Successfully complete a course of study with a minimum of 34 credits, including thesis — or with a minimum of 38 credits and comprehensive examinations for the non-thesis option. The student anticipating dual ASHA certification in speech pathology and audiology may need to complete eight or more additional credits in the non-thesis option. Academic requirements within the school include:

7700:611	Research Methods in Communicative Disorders I	3
7700:612	Research Methods in Communicative Disorders II	2
	or	
7700:699	Research and Thesis	4-6
7700:650	Advanced Clinical Practicum: Differential Diagnosis	1
Two credits must be taken from the following:		
7700:651	Advanced Clinical Practicum: Voice	1
7700:652	Advanced Clinical Practicum: Fluency	1
7700:654	Advanced Clinical Practicum: Diagnostic Audiology	1
7700:655	Advanced Clinical Practicum: Articulation	1
7700:656	Advanced Clinical Practicum: Language	1
7700:657	Advanced Clinical Practicum: Rehabilitative Audiology	1

The student must take four credits of 7700:695 Externship: Speech Pathology and Audiology. Two credits of 5610:693 Student Teaching in Speech Pathology or 5610:692 Student Teaching in Audiology may be substituted for two credits of 7700:695. (Although 5610:692 and 5610:693 are 6 hours of credit, only 2 of those credits may be substituted for 7700:695). The audiology student must take 4 credits in speech pathology, and the speech pathology student must take 4 credits in audiology. It is recommended that the speech pathology major elect 7700:639 Advanced Clinical Testing as the first of the audiology courses.

- The following limitations on work toward the degree may be exceeded only with the approval of two-thirds of the department's graduate faculty:
 - no more than 4 credits of workshop courses.
 - no more than 6 credits of directed study course work (including 7700:697); and
 - no more than 6 credits taken in disciplines other than communicative disorders.
- Only 7 credits of clinical practicum may be applied toward completion of degree requirements. These 7 credits may consist of externship, student teaching (maximum of 2 credits), and in-house practicum. However, the student may wish, or be required, to complete one or more practica in addition to degree requirements. Only 2 credits of student teaching (5610:693 or 5610:692) can be counted toward degree requirements. Students must be registered for clinical practicum, externship or student teaching during any academic period in which they are involved in in-house practicum, externship or student teaching.

Social Work

There is no graduate degree in social work. A student interested in course work may enroll if admitted to Graduate School through other programs or may apply for non-degree status through the School of Social Work. A student should enroll in graduate courses only for specific professional preparation and with the permission of the instructor. Courses presume a background in social welfare institutions, social work practice, social welfare policy and history. Inquiries should be directed to the director of the School.

College of Nursing

E. Jane Martin, R.N., Ph.D., *Dean*

V. Ruth Gray, R.N., Ed.D., *Associate Dean of Graduate Program*

Elaine Nichols, R.N., Ed.D., *Associate Dean of Undergraduate Program*

Phyllis Fitzgerald, R.N., Ph.D., *Assistant Dean of Student Affairs*

Janne R. Dunham, R.N., Ph.D., *Assistant Dean of Continuing Education*

MASTER OF SCIENCE IN NURSING

Philosophy

The College of Nursing, an integral part of The University of Akron, accepts the responsibility for promoting the general mission of the University, which is dissemination and pursuit of knowledge, the nurturing of intellectual curiosity, the search for truth and a conscious effort to serve the (nursing) student in the urban and rural community.

The College of Nursing faculty believe that the foci of professional nursing are individuals, families and communities.

The Individual is seen as a complex whole whose existence involves patterns, dynamic change, transformation and interdependence. The individual interrelates within the environment in biological, psychological, social, spiritual, cultural and other dimensions. The individual is unique and universal. The individual is a thinking, feeling, interacting, evolving, creating, valuing being.

Families are individuals dynamically connected with each other over time. Family configurations may be traditional or nontraditional.

Communities are groups of people with one or more common characteristics who are in relationship to one another and may or may not interact.

Health is comparative, dynamic, multidimensional and has personal meaning. It includes disease, nondisease and quality of life. People have the right to participate in decisions affecting and effecting personal health.

Environment includes all living and nonliving dimensions with which the individual, family and community have interrelationships. The dynamic environmental interrelations define and establish rules for health and modes of action.

Nursing is an art and a science. The discipline of nursing is concerned with individual, family and community and their responses to health within the context of the environment. Professional nursing includes the appraisal and the enhancement of health. Personal meanings of health are understood in the nursing situation within the context of familial, societal and cultural meanings. The professional nurse uses knowledge from theories and research in nursing and other disciplines in providing nursing care. The practice of nursing occurs in a variety of settings. The role of the nurse involves the exercise of social and cultural responsibilities, including accountability for professional actions and provision of quality nursing care.

Education is an individualized, life-long process. Learning is a continual process and includes the individual's interrelations with the environment. Knowledge acquisition, development of critical thinking and self-expression enable the student to respond to clients who have unique human values and cultural heritage. Each nursing student brings attitudes, beliefs, values, feelings, knowledge and experience into the learning environment. These variables influence learning. Learning occurs through continual construction and reconstruction of experience in relation to environmental influences. Nursing education at the baccalaureate level synthesizes knowledge from nursing, humanities, social, cultural, physical and natural sciences to operationalize the nursing process in practice. The student is prepared to function as nurse generalist in a variety of settings. Faculty and student continually seek to refine the commitment to and understanding of the relationship between theory and practice. Students are encouraged to become self-directed, collaborative, interdependent and independent. These variables are the foundation for life-long learning and professional development.

Nursing education at the master's level builds upon baccalaureate nursing preparation and is a foundation for doctoral study. Graduate education provides advanced learning to prepare specialists, educators and administrators in the practice of nursing. College of Nursing graduate students analyze and use a variety of theoretical formulations and research findings in advanced practice as well as plan and conduct research with guidance. The students develop expertise through self-direction, peer relations, personal valuing and faculty modeling and facilitation.

Characteristics of the Graduate

1. Promote health of families through sensitivity to cultural and ethnic diversity.
2. Actualize the leadership role in administration, education and clinical nurse specialization.
3. Assume accountability and responsibility for nursing practice through the application of professional standards and ethical principles.
4. Critically examine theories and models from nursing and other disciplines for their contributions to specialized nursing practice and advanced role preparation.
5. Integrate family theory and related research with clinical nursing practice.
6. Apply theoretical and empirical knowledge from the sciences, humanities and nursing in the management of advanced nursing practice with defined populations.
7. Contribute to the development of family nursing knowledge by generating and systematically studying researchable questions from nursing practice.
8. Recognize and promote the capacity of families from diverse populations to make personal decisions regarding health.
9. Facilitate exploration of researchable questions in nursing practice environments through support of investigative activities, collaboration with other researchers and enhancement of access to clients and data.

Admission

- Baccalaureate degree in nursing from an NLN-accredited nursing program.*
- 3.00 GPA on a 4.00 scale.
- GRE taken within the last five years with a minimum composite score of 1200.
- Three (3) letters of reference.
- 300-word essay.
- Interview prior to admission to the program.
- Current state of Ohio license to practice nursing and evidence of malpractice insurance.

Admission Procedures

The student secures application for Graduate School from the Office of the Dean of the Graduate School, The University of Akron. Criteria specific for admission to the Graduate Nursing Program may be secured from the associate dean of the graduate program of the College of Nursing.

A graduate admissions committee of the College of Nursing will review all applications and make recommendations to the associate dean regarding the applicant's status. The associate dean will send recommendation first to the dean of the college, then to the dean of the Graduate School, who will notify the student of admission status.

Applications received in the graduate office of the College of Nursing will be reviewed on a rotating basis to facilitate the admissions process.

Instructional Program

The Graduate Nursing Program includes 37 hours of study and provides advanced practice in education, administration or clinical nurse specialist roles. The curriculum is based on theory and research both in nursing and in related disciplines. It provides the foundation for doctoral study and for ongoing professional development.

Nursing Core

The core consists of 14 credits which span the curriculum. These courses encompass advanced theory, research and practice.

Nursing Research

All students enroll in a research core for a total of 7 credits. 8200:613, Nursing Inquiry; and 8200:699 Thesis Research provide for the operationalization of research in the program. Non-thesis options provide for advanced project/practice/study experiences.

Leadership Role

Options are provided for study in a leadership role of educator, administrator or clinical nurse specialist.

Electives

Students will choose a minimum of 3 credits of cognate electives. A student is required to take a minimum of 37 credits in the total program. Additional credits will provide the opportunity to individualize and strengthen the major. A 4-credit statistics course is a prerequisite to the Graduate Program.

*A baccalaureate degree in nursing from a foreign university which is recognized by The University of Akron.

The following courses are required of all students:

		<i>Credits</i>
8200.603	Theoretical Basis for Nursing	3
8200.613	Nursing Inquiry	3
8200.619	Nursing Assessment of Families	3
8200.622	Family Nursing I	4
8200.689	Colloquium	1
Select one of the following three areas:		
• Education:		
3100.695	Medical Physiology	3
8200.623	Family Nursing II	4
8200.625	Teaching Strategies in Nursing Education	3
8200.685	Leadership Seminar: Education	3
8200.686	Leadership Practicum: Education	3
	Clinical Support Course	3
	Cognate Elective	3
8200.699	Thesis/Nonthesis Research	1-4
• Administration:		
8200.489	Special Topics	1
8200.629	Financial Management for Nursing Administration	3
8200.630	Human Resources in Nursing Settings	3
8200.635	Organizational Behavior in Nursing Settings	3
8200.687	Leadership Seminar: Administration	3
8200.688	Leadership Practicum: Administration	3
	Cognate Elective	3
8200.699	Thesis/Nonthesis Research	1-4
• Clinical Specialization:		
3100.695	Medical Physiology	3
8200.623	Family Nursing II	4
8200.680	Leadership Seminar: Clinical Nurse Specialization	3
8200.681	Leadership Practicum: Clinical Nurse Specialization	3
	Clinical Support courses	6
8200.699	Thesis/Nonthesis Research	1-4
• Clinical Support Courses:		
8200.624	Nursing of Families with Growing Children	3
8200.626	Nursing of Families with Adult Members	3
8200.628	Nursing of Expanding Families	3
8200.670	Nursing of Families with Adolescents	3
8200.671	Nursing of Families with Older Members	3
• Additional Support Course:		
8200.675	Culture, Ethnicity, and Health Care	3

R.N.-M.S.N. PROGRAM

Admission Policies

The R.N.-M.S.N. Program is a graduate program, and as such, applicants must meet the following admission requirements:

- Current Ohio State license as a registered nurse and evidence of malpractice insurance.
- Grade-point average of 3.00 on a 4.00 scale for all previous college work.
- Three (3) letters of reference from: a recent employer; a member of the nursing profession; a former faculty member.
- Graduate Record Exam (GRE) taken within the last five (5) years.
- Three hundred (300) word essay describing professional goals.
- Interview with selected faculty members and submission of a portfolio.

Curriculum

The R.N.-M.S.N. program is designed for those registered nurses holding a diploma or associate degree in nursing who aspire to the Master of Science in Nursing degree. Students must complete 60 hours of prerequisite undergraduate coursework prior to acceptance into the program. The R.N.-M.S.N. Program consists of 15 hours of upper-division baccalaureate coursework and a minimum of 37 hours of graduate coursework. Students will receive 39 hours of undergraduate by-pass credit after successful completion of all undergraduate course requirements. This is in accordance with the current policy for by-passed credit. Upon successful completion of all program requirements, the student will receive the M.S.N. In the event a student must relocate prior to completion of the program, arrangements will be made to allow the student to complete the program through correspondence. This is assuming that the majority of the coursework has been completed.

R.N.-M.S.N. Bridge Courses:

8200.450	Concepts and Theories of Professional Nursing	3
8200.460	Issues and Roles of the Profession of Nursing	3
8200.470	Community Health	4
8200.485	Leadership Roles of Professional Nursing	5

Upon completion of the Bridge Courses, students follow the Graduate Curriculum.

College of Polymer Science and Polymer Engineering

Frank N. Kelley, *Ph.D.*, *Dean*
Rudolph J. Scavuzzo, *Ph.D.*, *Associate Dean*

HISTORY

The University of Akron has been a focus for training and research in polymer science since 1910 when Professor Charles M. Knight began offering courses in rubber chemistry. Master's theses treating rubber chemistry on the University library shelves date to 1920. The University began developing major laboratories in 1942 under the leadership of Professor G. S. Whitby, and the UA program played a significant role in the synthetic rubber industry of the U.S. government during World War II. An Institute of Rubber Research under the direction of Professor Maurice Morton was created in 1956, which became an Institute of Polymer Science in 1964. A Ph.D. program in Polymer Chemistry was introduced in 1956. In 1967, a Department of Polymer Science in the College of Arts and Science was formed which awarded M.S. and Ph.D. degrees in Polymer Science.

A Center for Polymer Engineering was created in 1983 and a Department of Polymer Engineering in the College of Engineering in January 1984 with Professor J. L. White as director and department head to give thrust to polymer processing and engineering applications.

In 1988 the College of Polymer Science and Polymer Engineering was established to consolidate the administration of the two academic departments, the Institute of Polymer Science and the renamed Institute of Polymer Engineering.

DESCRIPTION

The College of Polymer Science and Polymer Engineering carries out a program of research and education, primarily at the graduate level, and serves as a major intellectual resource for the scientific and technological development of polymers and related materials and processes. The college consists of the Department of Polymer Science, the Department of Polymer Engineering, the Institute of Polymer Science and the Institute of Polymer Engineering.

The Department of Polymer Science and the Institute of Polymer Science, emphasize polymer synthesis, the physical chemistry, physics and mechanical behavior of polymers, and many of their applications. The Department of Polymer Engineering and the Institute of Polymer Engineering, emphasize polymer processing (including reactive processing), solid state structure/morphology and properties of polymers as related to process history as well as engineering analysis and design. Collaborative research among the faculty in the two departments is common and provides a unique environment and capability for solving modern-day problems. This provides a fertile environment for students to obtain multidisciplinary training.

DOCTOR OF PHILOSOPHY DEGREE

Students may pursue the Doctor of Philosophy degree in either Polymer Science or Polymer Engineering.

Doctor of Philosophy In Polymer Science

An interdisciplinary program leading to the Doctor of Philosophy in Polymer Science is administered by the Department of Polymer Science. Graduates from the three main disciplines (chemistry, physics and engineering) are guided into the appropriate courses of study and research in that field under the supervision of a faculty member. Research facilities of the Institute of Polymer Science are available for thesis research. Students may be admitted directly to the Ph.D. program upon screening of their qualifications and recommendation by the department head and dean.

In addition to satisfying the general requirements of the Graduate School, a student working toward the Doctor of Philosophy in Polymer Science must meet the following requirements:

- Complete a course of study prescribed by the student's advisory committee based on the committee's judgment of the student's background and on the result of any special examinations it might impose. This course will consist of a minimum of, but usually more than, 36 credits in graduate courses, as outlined below, or their equivalent, plus sufficient Ph.D. research credits to make a total of 84 credits (exclusive of Master of Science thesis credit). Credits for participation in either Polymer Science or Polymer Engineering seminars do not apply toward the degree. At least 12 credits of graduate course work and all dissertation credits must be completed at the University.
- Pass eight cumulative examinations which are given at intervals during the academic year. The candidate is urged to begin these examinations early in the graduate program.
- Complete 9871:607,8 Polymer Science Seminar I and II
- Pass an oral examination upon completion of a research dissertation.
- Demonstrate competency in computer programming.
- Pass the general requirements for the Doctor of Philosophy degree.
- Satisfy the foreign language requirement for the doctoral degree by meeting the requirements of Plan A, B, or C as specified by the student's advisory committee. Appropriate research skills for Plan C are to be specified by the department on the basis of the student's area of specialization and intended research. These skills include proficiency in a computer programming language, special mathematical methods, applied statistical analysis, and special literature search techniques.

Doctor of Philosophy In Engineering (Polymer Engineering)

The Department of Polymer Engineering administers a graduate program in which graduate students, with primarily engineering backgrounds, are guided through a course of study and research under the supervision of a faculty member. Students may be admitted directly to the Ph.D. program upon screening of their qualifications and recommendation by the department head and dean.

Students in Polymer Engineering must satisfy the general requirements of the Graduate School and the department as stated below:

- Successfully complete a qualifying examination within three semesters after admission into the program. The examination shall cover graduate courses that the student has completed and basic undergraduate topics.
- Complete courses in the plan of study developed by the student advisory committee on the basis of the qualifying examination. A minimum of 90 credits of graduate work must be earned, including all course requirements listed for the Master of Science in Polymer Engineering degree.
- Pass a candidacy examination which may be taken after 90 percent of the course work specified in the plan of study has been completed.
- Pass an oral examination in defense of the dissertation.

MASTER'S DEGREE

Students may pursue Master of Science degrees in either Polymer Science or Polymer Engineering.

Master of Science in Polymer Science

- A minimum of 24 credits in appropriate courses in biology, chemistry, mathematics, physics, polymer science and engineering as prescribed by the advisory committee.
- Completion of a research project (9871:699) and the resulting six credits.
- Attendance at and participation in seminar-type discussions scheduled by the department. Credits for participation in either polymer science or polymer engineering seminars do not apply toward the degree.

Master of Science in Engineering (Polymer Engineering)

The major emphases of the graduate program in polymer engineering are in polymer processing, engineering performance and structural and rheological characterization of polymers.

This would involve an academic program of 33 credits, including 12 credits of core courses, three credits of approved mathematics courses and six thesis credits.

- Polymer engineering core:

9841:611	Structural Characterization of Polymers with Electromagnetic Radiation	2
9841:621	Rheology and Polymer Processing	3
9841:622	Analysis and Design of Polymer Processing Operations I	3
9841:631	Engineering Properties of Solid Polymers	2
9841:641	Polymeric Materials Engineering Science	2

- Polymer engineering elective

9841:601	Polymer Engineering Seminar	1
9841:623	Analysis and Design of Polymer Processing Operations II	3
9841:642	Engineering Aspects of Polymer Colloids	2
9841:651	Polymer Engineering laboratory	2
9841:661	Polymerization Reactor Engineering	3
- Approved engineering and science elective (a minimum of three credits of approved science or mathematics required):

3450:	Approved Mathematics	3
4300:681	Advanced Engineering Materials	3
4600:622	Continuum Mechanics	3
9871:613	Polymer Science laboratory	2
9871:674	Polymer Structure and Characterization	2
9871:675	Polymer Thermodynamics	2
- Thesis:

9841:699	Thesis	6
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- Attendance at and participation in department seminars as directed by the advisory committee is required.

Interdisciplinary and Certificate Programs of Study

*Not approved as
separate objective*

OVERVIEW

To add to the dimensions of the traditional disciplines, the University has established interdisciplinary and interdepartmental programs of study. In addition to a major, the student may elect to pursue one of these programs.

Interdisciplinary Studies programs feature courses which integrate and analyze issues and concepts from more than one field. The goal of this type of study is to place knowledge into a greater perspective than would be possible through any one traditional field. This is accomplished by taking courses from a variety of departments as well as courses which may be team taught. Interdisciplinary Studies and certificate programs will include coursework designated as 1800:_____.

Upon completion of any of these programs, a statement will be placed on the student's permanent record indicating the area of concentration. The certificate indicating the area of concentration will be awarded when the student completes requirements for a degree unless otherwise specified.

APPLIED POLITICS

Dr. John C. Green, *Director*

The Certificate Program, through the Ray C. Bliss Institute of Applied Politics, offers concentrated coursework in the history, organization and management of campaigns intended to influence the outcome of political decisions. This includes as a major focus, but is not limited to, efforts to capture elective public office in partisan contests. This program is available to any student who has a deep interest in practical politics. The set of courses comprising the certificate program is also incorporated as a track within the Bachelor of Arts and Bachelor of Science in Public Policy Management Program. Interested students are able to create degree programs with an emphasis on campaign management.

Requirements

Persons are eligible for admission to the Certificate Program in Applied Politics if they have been admitted to study as special, non-degree or full-time students in any department of the University. Students who are pursuing a graduate degree in other departments at the University may be admitted to the master's level certificate program upon the recommendation of the head of the department in which they are enrolled. Students shall seek admission to this program by filing an application with the political science department. The student will schedule courses with the assistance of an advisor in the department.

Core Courses

3700:540	Public Opinion and Political Behavior	4
3700:570	Campaign Management	3
3700:571	Campaign Finance	3
3700:573	American Political Parties	3
3700:695	Internship	3

Electives

In addition to the core courses, students must complete two of the following elective courses:

3700:690	Special Topics (Applied Politics Focus)*	3
3700:697	Independent Study*	3
3700:502	Politics and the Media	3
3700:572	American Interest Groups	3
3700:6XX	One American Politics Graduate Seminar*	3

Students must maintain at least a 3.0 average in the certificate coursework.

*Students must have prior approval of the Bliss Institute Director.

Certificate

Political science majors at both the undergraduate and graduate level will, upon completion of the program, be awarded a B.A., B.S. or M.A. in Political Science with a Certificate in Applied Politics. Majors in other disciplines will have the certificate noted on their permanent records.

COMPOSITION

Dr. Martin McKoski, *Director*

Requirements

To be eligible for the certificate in composition, a person must be admitted to the University as a graduate student (with either full or provisional status). An eligible person interested in the program should contact the program director. Five courses in composition and linguistics are required. Other appropriate English courses in composition or linguistics may be substituted as optional courses with the permission of the director.

Required Courses:

3300:576	Seminar: Theory and Teaching of Basic Composition	3
3300:673	Theories of Composition	3
3300:675	Seminar Research Methodologies in Composition	3

Optional Courses

3300:570	History of the English Language	3
3300:571	U.S. Dialects: Black and White	3
3300:589	Grammatical Structures of Modern English	3
3300:575	Theory of Rhetoric	2
3300:589	Seminar: Sociolinguistic	3
3300:670	Modern Linguistics	3
3300:689	Seminar: Stylistics	3
3300:689	Seminar: Contextual Linguistics	3

DIVORCE MEDIATION

Dr. Helen Cleminshaw, *Coordinator*

Requirements

This graduate certificate program in divorce mediation requires a minimum of 15 graduate credits dependent upon previous educational background. The program has been designed to serve the practicing or prospective divorce mediator.

All applicants to the program should have previously earned a law degree or a master's degree (at minimum in the behavioral sciences, such as psychology, social work, counseling and marriage and family therapy, or child and family development). Applicants planning to pursue the certificate must apply to the Center for Family Studies and the Graduate School for admission as non-degree students. Persons currently working toward a doctorate or Juris Doctor at the University may participate in the certificate program as a cognate or minor. In this case, students must receive permission from their academic department as well as admission from the Center for Family Studies. Since the educational preparation prior to entry to this program will be quite diverse, the selection of courses within the certificate will vary among the participants. However, all students are expected to complete the core courses in addition to 10 credit hours selected from among several disciplines related to divorce mediation.

Core

1800:601	Divorce Mediation	3
1800:602	Divorce Mediation Practicum	2

Select at least one from each area:

Law

9200:638	Family Law	3
7400:651	Family Consumer Law	3

Accounting

6200:601	Financial Accounting	3
9200:621	Accounting for Lawyers	3

Family

5600:655	Marriage and Family Therapy: Theory and Techniques	3
5600:667	Marital Therapy	3
7400:607	Family Dynamics	3

Electives

Students who have already completed coursework in Law, Accounting or Family may select from courses listed below:

5600:647	Career Counseling	3
5600:669	Systems Theory in Family Therapy	3
7400:602	Family in Life Span Perspective	2
7400:540	Family Crisis	3
7400:590	Family and Divorce	2
9200:684	Alternate Dispute Resolution	3

Electives*

1850:686	Retirement Specialist	2
3700:580	Policy Problems: Aging	3
3750:620	Psychology Core II: Developmental, Perceptual, Cognitive	4
3750:727	Psychology of Adulthood and Aging	4
3850:678	Social Gerontology	3
3850:681	Cross Cultural Perspectives in Aging	3
5400:541	Educational Gerontology Seminar	3
5400:661	Current Issues in Higher Education: Life-Span and Community Education	2
6500:687	Seminar in Health Services Policy and Administration	3
7400:603	Family Middle and Later Years	2
7700:697	Special Problems: Speech Pathology	2
7700:550	Social Needs and Services for Later Adulthood and Aging	3

GERONTOLOGY

Dr. Harvey Sterns, *Director*
 Dr. Isadore Newman, *Associate Director*
 Mrs. Evelyn Sutton, *Program Coordinator, Gerontology*
 Dr. Jerome Kaplan, *Program Coordinator, Nursing Home Administration*

Requirements

This certificate program is a special course of study along with undergraduate and graduate degree programs in various departments and colleges throughout the University. Individuals who already hold undergraduate or graduate degrees may also pursue the certificate. The program represents a concentration involving current knowledge and research in gerontology. It adds another dimension to the knowledge and skills a student is able to offer in the many professions that are becoming specialized in research and service to adults and older adults. This course of study coordinates multidisciplinary training of personnel in adult development and aging and helps to meet the critical shortage of trained individuals in the field of gerontology.

The undergraduate and graduate curriculum committees of the institute will oversee this certificate program and certify through the director of the institute that all requirements for the certificate have been completed.

In addition, this certificate is included in the Ohio Board of Examiners of Nursing Home Administrators approved course of study in Nursing Home Administration which combines a Bachelor of Science in Industrial Management (Personnel Option) with a Certificate in Gerontology.

B.S./M.D. students may complete Practicum Internship and electives from available gerontology courses or the Office of Geriatric Medicine and Gerontology, NEOUCOM.

Admission

To participate in the program, a student should:

- Be formally admitted to The University of Akron as an undergraduate, postbaccalaureate or graduate student.
- Make written application to the program countersigned by student's major academic adviser.
- Have an interview with a designated faculty member of the Institute for Life-Span Development and Gerontology.
- Receive written notification for admission from the director of the Institute for Life-Span Development and Gerontology.
- Consult with the director or a designated faculty member to formulate a program of study.

Program

Minimum: 18 credits.

Core

1850:680	Interdisciplinary Seminar in Life-Span Development and Gerontology Practicum/Internship	3
1850:695	Practicum/Internship	3

Students must complete a research methods course of three credits.

HIGHER EDUCATION

Requirements**

This certificate program in higher education requires a minimum of 15 credits. The program of studies has been designed to serve the practicing or prospective college or University administrator or instructor.

Admission

All applicants to the program should have previously earned a master's degree. Special admission to concurrent studies toward a master's degree and the higher education certificate may be allowed for persons currently employed in higher education. Students interested in this admission category should first meet with the director of the Center for the Study of Higher Education. The person wishing to pursue a doctorate in an academic department may concurrently undertake the certificate program as a cognate or minor. Such students must apply to the Graduate School for admission to the academic department and also apply for admission to the Center for the Study of Higher Education and must be admitted to both programs. Applicants wishing to pursue only the certificate program must apply to the Graduate School for admission as a special non-degree student.

Program

Courses and internships in higher education are directed toward the study of administrative and academic operations of colleges and universities. Specific program options include: administration, student services, curriculum and instruction. Each of the options require an internship. In the case of the curriculum and instruction option, a higher education teaching internship developed in conjunction with the student's major academic adviser and the center staff may be anticipated. Internships may be completed at the University or at one of several cooperating institutions.

Required:

5100:703	Seminar: History and Philosophy of Higher Education	3
5900:700	Introductory Administrative Colloquium in Higher Education	1
5900:800	Advanced Administrative Colloquium in Higher Education	1
5900:801,2	Internship and Internship Seminar	2
	Independent Study or course work to support concentration and bring total hours to a minimum of 15.	8

Options

A student may select all three courses listed as "A" and omit "B" or may select an area of concentration and take one course from "A" under I, II or III and the supporting course from "B" from the same heading.

Organization and Administration in Higher Education (I)

5700:704	Administrative Organization in Education (A)	2
5900:715	Seminar in Higher Education: Administration in Higher Education (B)	3

Student Services in Higher Education (II)

5600:649	Counseling and Personnel Services in Higher Education (A)	3
5900:725	Seminar in Higher Education: Student Services (B)	3

*Select a minimum of nine credits. A student is required to take two of the three electives outside the major or degree department. One credit workshop may be included as an elective, with permission.

**The awarding of this certificate is not contingent upon completion of a degree program. Undergraduate certificate programs require a 2.00 grade-point average; graduate certificate programs require a 3.00 grade-point average.

Program Planning, Curriculum and Instruction in Higher Education (III)

5900:730	Higher Education Curriculum and Program Planning (A)	3
5900:735	Instructional Strategies and Techniques for the College Instructor (B) or Principles of Curriculum Development (B)	3
5700:710	Principles of Curriculum Development (B)	3

HOME-BASED INTERVENTION THERAPYHelen K. Cleminshaw, *Coordinator**Certificate***Program**

18 graduate credits must be successfully completed in the following areas as outlined below.

Core Courses

Students must successfully complete 1820:603, 604 and the 9 credits of eligibility courses prior to taking 1820:605.

1820:603	Home-based Intervention Theory	3
1820:604	Home-based Intervention Techniques and Practice	3
1820:605	Home-based Intervention Internship	3-5

Eligibility Courses

Students must have completed at least 9 credits of coursework in theoretical frameworks from their discipline or related areas as follows: systems theory; developmental theory; therapeutic theory.

Theoretical Frameworks

• Systems Theory		
3850:620	General Systems Theory	3
5600:643	Theories and Philosophy of Counseling	3
5600:655	Marriage and Family Therapy: Theory and Techniques	3
7400:607	Family Dynamics	3
• Developmental Theory		
3850:512	Socialization: Child to Adult	3
7400:602	Family in Life Span Perspective	2
7400:605	Developmental Parent-Child Interactions	3
7400:610	Child Development Theories	3
• Therapeutic Theory		
5600:651	Techniques in Counseling	3
5600:667	Marital Therapy	3
5600:669	Systems Theory in Family Therapy	3
7750:553	Social Work with Families	3

Elective Courses

Students may select one course from three different disciplines as listed below to fulfill their elective requirement with approval from their adviser and director of the certificate program.

Specific Skill Areas

• Counseling		
5600:550	Counseling Problems Related to Life/Death	3
5600:620	Multicultural Counseling	1-4
5600:620	Substance Abuse	1-4
5600:620	Human Sexuality	1-4
• Home Economics and Family Ecology		
7400:501	Family Life Patterns in the Economically Deprived Homes	2
7400:504	Adolescence in the Family Context	3
7400:506	Family Resource Management	3
7400:540	Family Crisis	3
7400:542	Human Sexuality	3
7400:546	Culture, Ethnicity, and the Family	3
7400:590	Family and Divorce	2
7400:596	Parenting Skills	3
7400:675	Conceptual Frameworks in Family Ecology	3
• Sociology		
3850:550	Sociology of Mental Health	3
3850:688	Human Ecology	3
3850:753	Family and Health (Special Topics)	1-3
• Psychology		
3750:530	Psychological Disorders of Children	4
3750:704	Theories of Personality	3

• Social Work		
7750:551	Social Work and Child Welfare	3
7750:552	Social Work and Mental Health	3
7750:554	Social Work in Juvenile Justice	3
7750:510	Minority Issues in Social Work Practice	3
• Nursing		
8200:622	Family Health Nursing I	3
• Multicultural Education		
5630:582	Characteristics of Culturally Different Youth	3
• Special Education		
5610:540	Developmental Characteristics of Exceptional Individuals	3
5610:546	Developmental Characteristics of Behaviorally Disordered Individuals	3
5610:560	Working with Parents of MSPR Individuals	3
5610:604	Education and Management Strategies for Parents of Exceptional Individuals	3

MID-CAREERS PROGRAM IN URBAN STUDIESDr. Peter J. Leahy, *Department Head***Requirements**

The program will require the completion of 16 graduate credits in a single area or in several areas in the urban field. Upon the completion of the program, a certificate will be granted.

Admission

A student must satisfy the requirements for entrance in graduate programs or have a bachelor's degree and the equivalent of five years' experience in a professional, administrative or leadership position, in which case the student shall be admitted as a non-degree student. A student may wish to pursue additional electives. However, a student admitted to this program will be limited to 20 credits. If the student wishes to pursue more than 20 credits, the student must be admitted to the M.A. program in urban studies.

Program

The Mid-Careers Certificate Program in Urban Studies will require the successful completion of a plan of study which must include a minimum of 16 credits of work in existing courses offered by the Department of Urban Studies. The core program and areas of study are listed below. Electives will be chosen in consultation with the adviser from the approved list of courses. Courses offered by other departments will be accepted if they are urban related and will specifically contribute to the student's objectives.

Core

3980:600	Basic Analytical Research*	3
	or	
3980:601	Advanced Research and Statistical Methods*	3

Options**Public Administration**

3980:611	Introduction to the Profession of Public Administration	3
3980:640	Fiscal Analysis	3
3980:643	Introduction to Public Policy	3
	Elective(s)	4

Urban Research Methods

3980:670	Research for Futures Planning	3
3980:673	Computer Applications in Public Organizations	3
	Elective(s)	4

Urban Planning

3980:630	Introduction to Planning Practice and Theory	3
3980:681	Selected Topics: Urban Planning Design	3
3980:681	Selected Topics: Planning Theory and Innovation	3
	Elective(s)	4

Urban Service Systems

3980:620	Social Services Planning	3
3980:621	Urban Society and Service Systems	3
3980:671	Program Evaluation in Urban Studies	3
	Elective(s)	4

Urban Studies

3980:602	History of Urban Development	3
3980:6--	Elective(s)	10

PUBLIC POLICY

Dr. Carl Lieberman, *Chairman, coordinating committee*

Program

This program will assist the person in understanding, formulating and implementing decisions in the public realm. A person who is interested in government service, administration of publicly supported institutions and the teaching of government at the college level should find such an interdisciplinary program to be of great value.

Admission

Persons are eligible for admission to the graduate Certificate in Public Policy Program if they have been admitted to graduate study as non-degree students in the departments of economics, political science or sociology, or are pursuing a master's or doctoral degree in one of those three departments. Students who are pursuing a graduate degree in other departments at the University may be admitted upon the recommendation of the head of the department in which they are enrolled.

Requirements**Core**

Each student enrolled in the program shall complete three of the following courses — one from the Department of Economics, one from the Department of Political Science and one from the Department of Sociology.

Economics

3250:530	Human Resource Policy	3
3250:606	Public Finance	3
3250:665	Seminar on Economic Planning	3

Political Science

3700:541	The Policy Process	3
3700:542	Methods of Policy Analysis	3
3700:668	Seminar in Public Policy Agendas and Decisions	3
3700:670	Seminar in the Administrative Process	3

Sociology

3850:613	Sociology of Program Evaluation and Program Improvement	3
3850:679	Political Sociology	3

In addition to the courses listed above, each student, after receiving the approval of his or her adviser, shall complete two courses related to public policy.

Each student shall complete a scholarly paper dealing with public policy under the direction of a graduate faculty member in the departments of economics, political science or sociology. The student shall enroll for three credits in one of the following courses: 3250:697/698 *Reading in Advanced Economics*, 3700:697 *Independent Research and Readings* or 3850:697 *Readings in Contemporary Sociological Literature*. The student's paper shall be evaluated by an interdisciplinary committee consisting of graduate faculty from at least two of the previously mentioned departments.

All persons enrolled in the Graduate Certificate Program in Public Policy must successfully complete 3700:695 *Internship in Political Science*, a course which will permit a student to gain experience working with public officials, government agencies, political parties or interest groups. A student will normally enroll in this course after having completed at least 12 semester credits of work relating to public policy. A person with extensive administrative or governmental experience may be permitted, with the approval of the student's adviser, to substitute another course dealing with public policy in place of the *Internship in Political Science*.

At least two-thirds of the credits earned for this certificate must be in 600- or 700-level courses. No more than three courses in which the student enrolls, of the seven required for the Graduate Certificate in Public Policy, may also apply toward meeting requirements for a graduate degree at The University of Akron.

The student must maintain at least a "B" (3.00) average in course work for the certificate.

Administration of the Program

The departments of economics, political science and sociology shall each annually select a representative for a coordinating committee from among those members of the graduate faculty who have special knowledge or expertise in the area of public policy. The committee shall each year elect one of its members as chairperson. The chairperson shall be responsible for disseminating information about the certificate, certifying that a student has met requirements for the completion of the program and convening members of the coordinating committee whenever appropriate.

SOVIET AREA STUDIES

Dr. Barbara Clements, *Coordinator*

Requirements

To obtain a certificate in Soviet Area Studies, the undergraduate will satisfy the requirements for a baccalaureate major in the field of study of his or her choice. In addition the student will complete two years of Russian language (14 credits) and will also complete 12 additional credits in courses dealing with the study of the U.S.S.R. These courses may be selected from the following list:

Economics

3250:450/550	Comparative Economic Systems	3
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Geography

3350:358	U.S.S.R.	3
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History

3400:458/558	Russia to 1801	3
3400:459/559	Russia since 1801	3

Political Science

3700:300	Comparative Politics	4
3700:322	Soviet and East European Politics	3

TEACHING ENGLISH AS A SECOND LANGUAGE†

Dr. Kenneth J. Pakenham, *Director*

Certificate

Requirements

This program is intended for those who seek training in the teaching of English as a second language (ESL) at the elementary or high school level or who wish to obtain an initial qualification in teaching ESL in order to teach in settings other than the Ohio public school system.

The program is designed to introduce the student to the central issues in the theory and practice of teaching English to non-native speakers through courses in modern and applied linguistics, in second language pedagogy and in related disciplines.

Students who do not have English as a native language must demonstrate adequate proficiency in English with a valid TOEFL score of at least 550.

Program

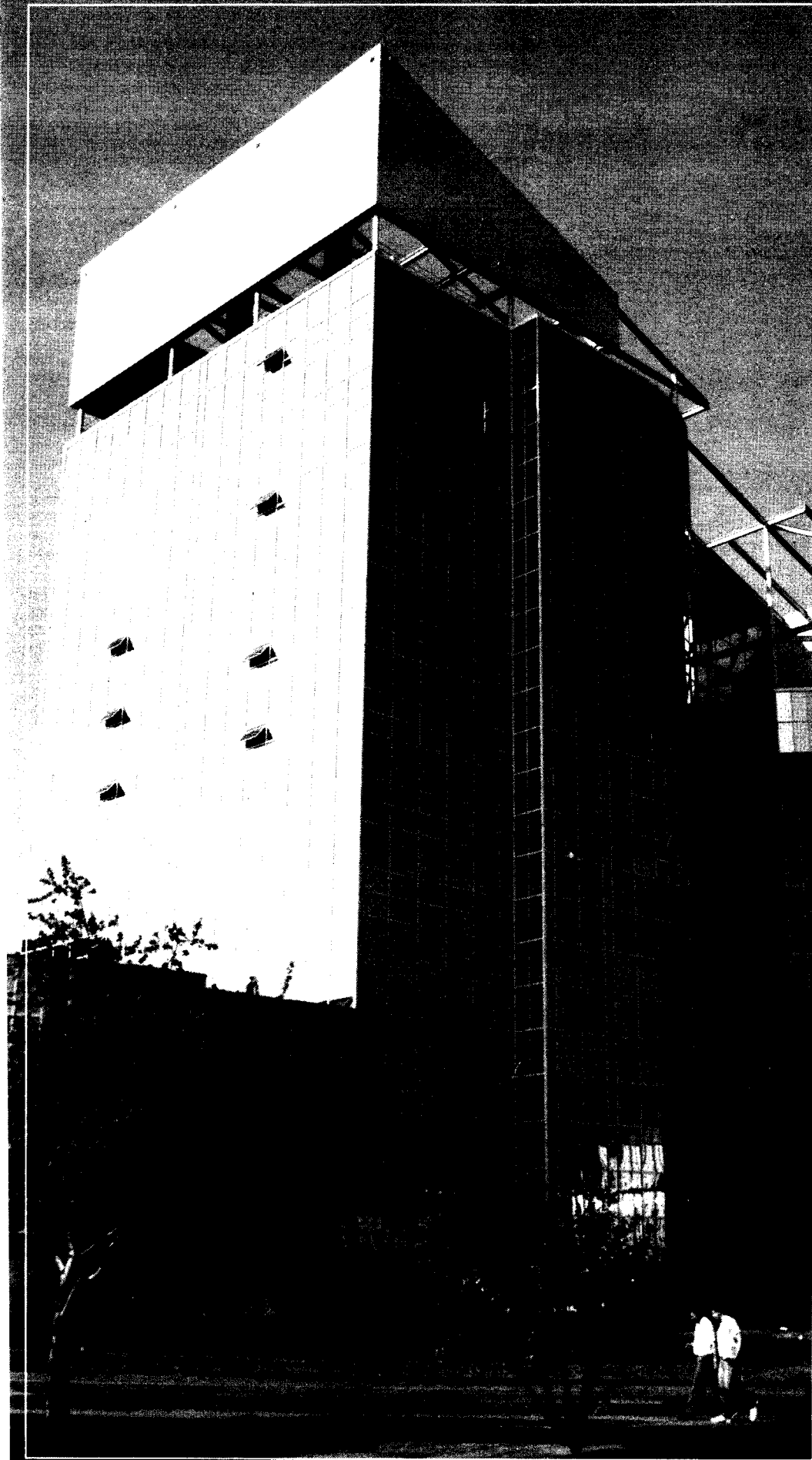
3300:589	Special Topics: Theory and Method of ESL	3
3300:589	Special Topics: Grammatical Structures of English	3
5630:581	Multicultural Education in the U.S.**	3
	or	
3300:589	Special Topics: Sociolinguistics**	3
5630:587	Techniques for Teaching ESL	3

†The awarding of this certificate is not contingent upon completion of a degree program. Undergraduate certificate programs require a 2.00 grade-point average; graduate certificate programs require a 3.00 grade-point average.

**Choice to be decided in consultation with the program director.

SECTION
Five

Research centers
and institutes



Research Centers and Institutes

Claibourne Griffin, Ph.D., *Interim Associate Vice President for Research and Graduate Studies; Dean of Buchtel College of Arts and Sciences*
 Frank Kelley, Ph.D., *Dean, College of Polymer Science and Engineering (Member)*
 Nicholas Sylvester, Ph.D., *Dean, College of Engineering, (Member)*
 Charmaine C. Streharsky, M.S.T.E., *Director of Research Services and Sponsored Programs*
 Ted Mallo, J.D., *Assistant Professor, General Counsel, (Member, ex officio)*

In the past, colleges and universities have been thought of as ivy-covered storehouses of knowledge where neatly packed information was dispensed to eager students. But this has never been true, for it is here that much of the new knowledge is developed. And with the accelerating tempo of our times, there is an increased call for universities to provide more information to enable society to cope.

The University of Akron is alive to this challenge and has sought to develop its research program with an eye to the needs of the society it serves. Here the emphasis is on work that is relevant, not on mere knowledge for knowledge's sake. One consequence of the University's concern with relevant research has been the number of interdisciplinary teams that have been put together to tackle specific problems. For instance, problems in connection with water pollution have used the services of chemists, biologists and chemical, mechanical and civil engineers. While the planning and organization of a research project is usually carried out by or with the assistance of a faculty member, both graduate and undergraduate students have the opportunity to participate, depending on the nature of the project and the skills and knowledge required.

Sponsored research activities on campus are coordinated by the Research Council founded in 1962; it also serves as the policy-making body for research. The council consists of the associate vice president for research and graduate studies, the director of research services and sponsored programs, various college deans, and general counsel.

Ray C. Bliss Institute of Applied Politics

John C. Green, Ph.D., *Director*

The Ray C. Bliss Institute of Applied Politics is a public education and research adjunct of The University of Akron and its Department of Political Science. The broad purposes of the institute, in keeping with the career of its namesake and the respect that he gained over many years in the political world, are: to give all citizens, and particularly young people, an opportunity to learn how to become active and competent in political life; to help maintain a tradition of ethical public service in politics; to foster useful relationships between applied politics and political science; to promote public comprehension of political organizations and the requirements for their effectiveness; to improve understanding of continuity and change in American political institutions; and to provide advanced experience in practical politics to students with primary career goals in political science.

Institute for Biomedical Engineering Research

Daniel B. Shaffer, Ph.D., *Director*

This institute was established in 1979 to promote interdisciplinary studies in the rapidly growing areas of knowledge which overlap the fields of biology and medicine, on the one hand, and engineering and the physical sciences, on the other. It conducts seminars, courses and degree programs in biomedical engineering in association with the College of Engineering and individual departments.

In addition to its research and educational functions, the institute provides a research service to local hospitals and industry, as well as to private and government agencies. The premise for this program is that the combined resources of the University, Northeastern Ohio Universities College of Medicine and

affiliated organizations will often permit more cost-effective solutions than would be possible by an individual or group doing the research independently.

The work of the institute is carried out by faculty of the Department of Biomedical Engineering in association with "members" selected from the faculties of The University of Akron and Northeastern Ohio Universities College of Medicine, as well as from the ranks of area physicians, engineers and scientists. The institute and the department occupy the third floor of the Engineering Research Center on the north edge of the campus.

Center for Economic Education

Fred M. Carr, Ph.D., *Director*

The center exists to improve the economic literacy of individuals to help them function competently as citizens, producers and consumers.

The center conducts workshops, seminars and economic programs for teachers, students and interested groups. It provides consulting services in the area of economic education and acts as a clearinghouse for the gathering and dissemination of economic education materials and programs. It also fosters an understanding and appreciation of the American economic system.

Center for Environmental Studies

Jim L. Jackson, Ph.D., *Director*

The Center for Environmental Studies matches the expertise of 95 affiliates in 33 disciplines with the needs of students seeking study and research opportunities in complex environmental issues. Since its founding in 1970, the center has sponsored, or in other ways supported, activities appropriate to the goal of attaining a quality environment for mankind.

The center coordinates special forums, workshops and seminars that address major issues. Examples include the National Energy Forum, the World Food Forum, and Evaluation of Environmental Data. Workshops on energy, natural history and environmental studies in England also emphasize the interdisciplinary approach to the resolution of issues.

The center provides programs of environmental studies in the Cuyahoga Valley National Recreation Area (CVNRA). These programs are operated through the University's Cuyahoga River Interpretive Center. Water research is a major role of the Center.

Center for Family Studies

Helen K. Cleminshaw, Ph.D., *Director*

Mary C. Rainey, Ph.D., *Associate Director of Development*
 Nancy B. Miller, Ph.D., *Associate Director of Research*

The Center for Family Studies, established in 1979, was designed to stimulate and encourage the interdisciplinary study of the family. It serves both the University and the community by fostering collaboration between faculty, students, practitioners and community leaders on curriculum development, educational conferences and seminars, research and training, and public policy relevant to important family issues.

The Center is represented by faculty from five colleges and over 15 disciplines. It also includes leaders from various community systems, such as the schools, hospitals, courts, churches, mental health, social and health care agencies. In addition, the Center has a fellows program in which outstanding faculty and community leaders are named as either fellows, adjunct fellows or senior fellows.

Presently, the Center has two graduate interdisciplinary certificate programs. The *Home-Based* certificate program is funded by grant monies from the Ohio Department of Mental Health and directed by Dr. Carol Pastore. The *Divorce Mediation* certificate program has received research funds from the Ohio Supreme Court and the Ohio Commission on Dispute Resolution and Conflict Management.

Any student, faculty member or community person interested in family issues is invited to call the director to learn how they can participate or learn more about the Center's activities.

Training Center for Fire and Hazardous Materials

David H. Hoover, M.S., *Director*

The Training Center for Fire and Hazardous Materials brings the University, government and industry together into one comprehensive regional center to integrate educational programs, fire and hazardous materials training and other applications of fire and safety technology. The center coordinates seminars and workshops presented by the Federal Emergency Management Agency (FEMA), the Division of State Fire Marshal and other related organizations. Training in all phases of hazardous materials containment and fire prevention and control is

provided under contract to various municipalities, industries and agencies. The programs are supported by the faculty of the Fire Protection Technology degree program in association with other state and nationally recognized professionals.

Institute for Futures Studies and Research

Gary Gappert, Ph.D., *Director*

The Institute for Futures Studies and Research exists to initiate and provide comprehensive programs in salient and vital policy research, including a structural framework which encompasses strategic planning, environmental scanning, trends analysis and other innovative research methods.

The Institute for Future Studies and Research was established in 1978, with its focus on interdisciplinary courses, lectures, publications and activities relating to relevant issues which will impact the future of the local, state, national, and international arenas. It cooperates with the Center for Urban Studies and other research institutes.

Since 1987, The Ohio Issues Scanning Programs, through the Ohio Scanning Network (OSN), continues to research and analyze emerging public policy issues in the state of Ohio and beyond. In addition, in 1990, the OSN began to provide and disseminate viable options to a diverse range of policy problems. *Ohio Foresight* is a bimonthly publication of the Ohio Scanning Network.

More recently, the Institute has undertaken initiatives relating to international activities and global studies, with a focus on education, economic and political change as well as policy development. The Institute has cooperated with the U.S. Peace Corps in both Washington, D.C. and Africa on its new urban initiatives. An Ohio-Quebec Urban Symposium was conducted in 1990 as an effort to continue promoting Great Lakes collaboration and Canadian studies. Discussions have been held in several Eastern Europe countries concerning urban planning and future studies. In these emerging activities, the Institute encourages involvement and cooperation of faculty, staff and students from a variety of disciplines.

Through its relationship with the Department of Urban Studies and The Center for Urban Studies, the Institute has organized and produced three books relating to the urban future including the 1990 publication, *Cities in a Global Society*. It has also sponsored major conferences on George Orwell and Aldous Huxley in cooperation with the Ohio Humanities Council.

Institute for Life-Span Development and Gerontology

Harvey L. Sterns, Ph.D., *Director*

Isadore Newman, Ph.D., *Associate Director*

Evelyn Sutton, M.A., *Program Coordinator*

Jerome Kaplan, Ph.D., *Program Administrator*,
Nursing Home Administration

The Institute for Life-Span Development and Gerontology, founded in 1976, coordinates multidisciplinary credit certificate programs in gerontology at the undergraduate and graduate levels. In addition, this certificate is included in the Ohio Board of Examiners of Nursing Home Administrators approved course of study in Nursing Home Administration which combines a Bachelor of Science degree in Industrial Management (Personnel Option) with a certificate in Gerontology.

Faculty fellows at the institute representing 22 University departments conduct research, and provide special courses, workshops, and seminars as well as participate in community research and demonstration projects. Students in the certificate programs carry out field placements at numerous community service settings, including the Adult Resource Center.

Examples of outreach activities include the Elderhostel program, offered each summer for older adults who participate in a week-long residential learning experience.

The institute is a member of the Northeastern Ohio Consortium on Geriatric Medicine and Gerontology, joining together with the Office of Geriatric Medicine and Gerontology, Northeastern Ohio Universities College of Medicine; Gerontology Center, Kent State University; and Gerontology Committee, Youngstown State University.

Center for Nursing

Maryhelen Kreidler, R.N., Ed.D., *Director*

The Center for Nursing is the practice arm of the College of Nursing. Since 1981 it has provided a clinical laboratory for students and faculty. The center provides nursing services to campus students, faculty and staff, and community residents of all ages. These services include health assessments and nursing physicals,

stress management and self-care assistance, family education and group support sessions. Outreach to the elderly, women, children and community agencies is also a major emphasis of the center.

Center for Organizational Development

Joseph C. Latona, Ph.D., *Director*

The Center for Organizational Development in the College of Business Administration is an outgrowth of the Institute of Business and Economic Research which was one of the four facets of the Research Council established in September 1962 by the University Board of Trustees. The institute was renamed in 1975 as its functions had been expanding to fill a community need. The general goal of the center is to update the organizational skills of area managers in all types of organizations and at all levels. The center cooperates with business, government, professional and service groups in evaluating and analyzing their specific needs, designing programs and coordinating programs to meet the particular needs of these groups.

Center for Peace Studies

Hon. John F. Seiberling, L.L.B., *Director*

The Center for Peace Studies provides students with the opportunity for an interdisciplinary course of study in one of the related fields of international peace or conflict resolution and management. Course programs draw on the resources of a wide spectrum of the University's academic departments. Upon completion of all selected courses, students receive not only academic credits for the courses but a Certificate in Peace Studies or a Certificate in Conflict Resolution/Management, respectively. The Center also sponsors workshops for teachers, special campus programs, and research projects. It also collaborates with community organizations and peace centers on other campuses.

Institute of Polymer Engineering

James L. White, Ph.D., *Director*

The Institute of Polymer Engineering carries out fundamental and applied research in polymer processing, engineering performance and associated characterization.

The institute, founded in 1983, seeks to be a major intellectual and research resource in northeast Ohio. The institute maintains up-to-date and futuristic processing and characterization laboratories, with continued interest in development investigation of new process technology and new materials. Its activities also include organization of scientific symposia and various seminars related to polymer processing and engineering.

Institute of Polymer Science

Darrell H. Reneker, Ph.D., *Director*

The institute is concerned with basic and applied research in polymers. It was established in 1956 as the Institute of Rubber Research and in 1964 became the interdisciplinary Institute of Polymer Science. The University's first Ph.D. program in polymer chemistry was started in 1956 and was administered by the institute until a separate Department of Polymer Science was established in 1967. The institute maintains extensive laboratory facilities, an applied research group, a macromolecular modeling center, and a mini pilot plant for polymer synthesis. It is the principal organization responsible for external funding of research projects and graduate fellowships in polymer science.

Process Research Center (PRC)

Sunggyu Lee, Ph.D., *Director*

Kathy L. Fullerton, Ph.D., *Assistant Director*

The Process Research Center (PRC), founded in 1990, focuses on fundamental and applied research involving new chemical processes and novel materials.

The specialties of the PRC include chemical reactions, separation technology, new polymeric materials, biotechnology, and environmental engineering. In conjunction with this, the Center operates several scale-up and minipilot plant facilities.

The PRC aims at responding more positively to the needs of industries and enhancing cooperation between the University and industries. Great opportunities are available for both graduate and undergraduate students to conduct practical research.

Small Business Institute

Joseph C. Latona, Ph.D., *Director*

The Small Business Institute was established in 1973 and was the first Small Business Institute funded in Northern Ohio. The Small Business Institute's objective is to offer management assistance counseling to area organizations through the utilization of senior students in the College of Business Administration, working as advisers under the supervision of College of Business Administration faculty. Nearly 300 firms have been serviced by the institute since its founding. It is an integral part of the Akron/Summit Industrial Incubator project.

Center for Taxation Studies

Richard W. Metcalf, D.B.A., *Director*

The Center for Taxation Studies, established in 1985, is a joint venture of the College of Business Administration and the School of Law. Funding for the center is provided under an Academic Challenge grant, part of the Ohio Board of Regents' Selective Excellence Program.

The center focuses on studies in tax policy which are directed toward legislative changes regarding federal, state and local taxation and their effect on individuals and businesses. Further, the center sponsors and monitors research by tax scholars and professionals. It also conducts taxation seminars, presentations and programs directed toward both the tax professionals and laity. The center oversees operation of the Tax Clinic and the Volunteer Income Tax Assistance (VITA) site for electronic filing. Studies concerning taxation are coordinated by the center with other disciplines on campus. For example, projects have been undertaken in the following areas: business, law, political science, urban studies, finance, economics and English (document design).

Center for Urban Studies

James L. Shanahan, Ph.D., *Director*

Gail A. Sommers, M.A., *Assistant Director*

One of the greatest challenges for an urban university is utilizing its resources for resolving urban problems and improving the urban environment. The Center for Urban Studies (CUS), established in 1965, was this University's response to that challenge. The center develops research and professional service projects in response to the needs of the urban community and to perceived urban issues. The Center's objectives are to apply new methods and to experiment with new approaches to solving urban problems. The main portion of CUS activities is supported by grants and contracts which faculty and staff bring to the University.

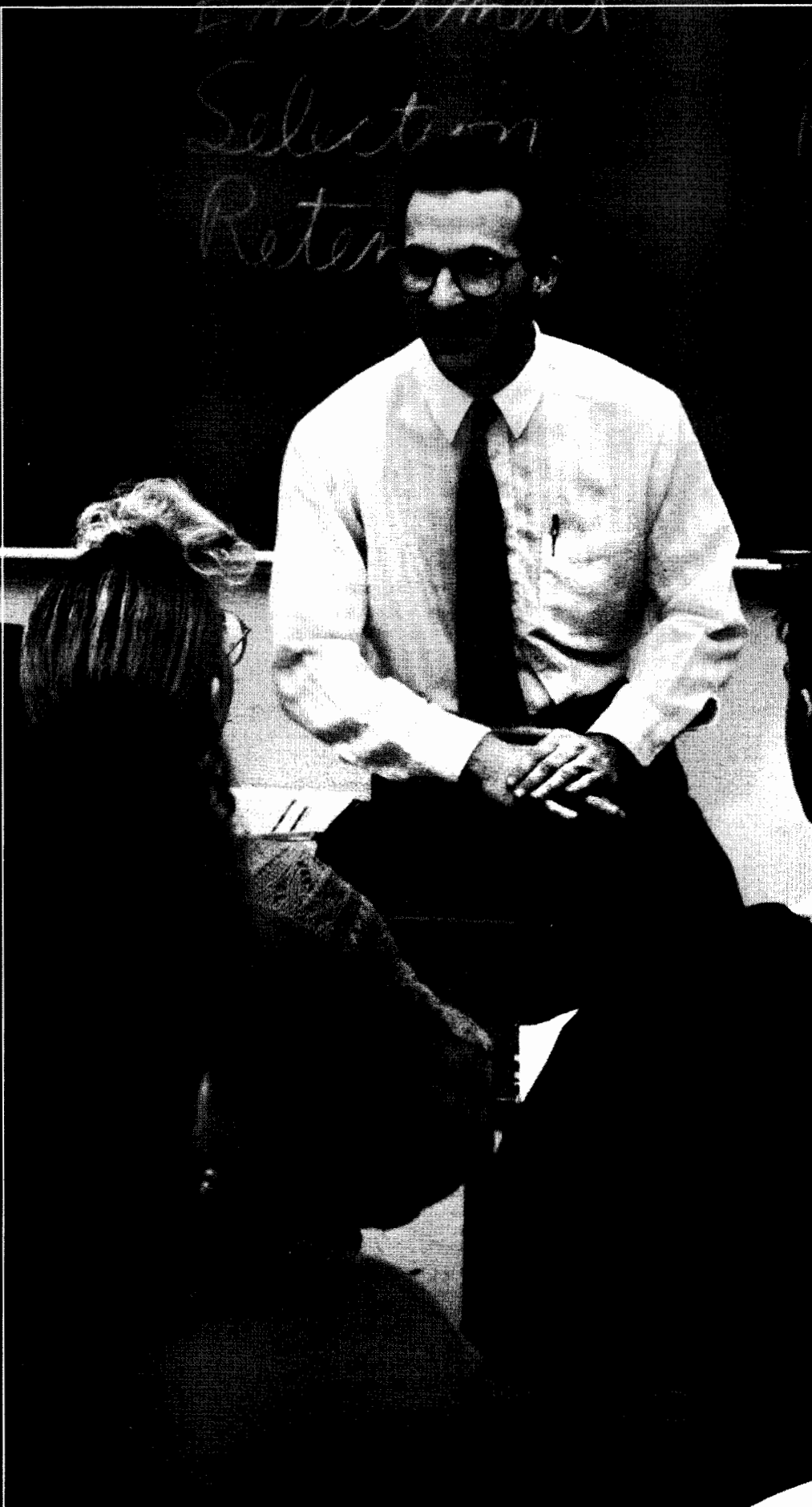
The Center provides advisory and research expertise in a wide range of areas to both the public and private sectors. Every effort is made to identify political, economic, and social issues of the utmost importance to the future of Ohio communities, their leaders, businesses, institutions, community groups, and citizens.

The Center, a part of the Buchtel College of Arts and Sciences, strives to stimulate within the University creative solutions to urban problems by coordinating the urban perspective of the various disciplines and professions. This multidisciplinary approach encourages faculty and graduate student participation from all departments with an urban focus. With its programs in research and professional service, the center provides the setting and facilities through which interested faculty and graduate students do become involved in urban research or professional service activities to the urban community. For many graduate students, experience gained in the Center for Urban Studies becomes an important complement to formal classroom training in their career preparation.

*Smartment
Selection
Rater*

SECTION **Six**

Courses of Instruction



Course Numbering System*

INDEX

Department of Developmental Programs

1020 Developmental Programs

English Language Institute

1030 English Language Institute

University College

1100 General Studies

Air Force ROTC

1500 Aerospace Studies

Army ROTC

1600 Military Science

Interdisciplinary Programs

1800 Divorce Mediation
 1810 Afro-American Studies
 1820 Home-based Intervention Therapy
 1830 Environmental Studies
 1840 Women's Studies
 1850 Institute for Life-Span Development and Gerontology
 1860 Peace Studies
 1870 Honors Program
 1880 Medical Studies
 1890 Environmental Health

Community and Technical College

2000 Cooperative Education
 2015 Distinguished Student Program
 2020 Associate Studies
 2030 Associate Studies — Mathematics
 2040 Associate Studies — Social Sciences
 2100 Individualized Study
 2200 Educational Technology
 2210 Handicapped Services
 2220 Criminal Justice Technology
 2230 Fire Protection Technology
 2240 Commercial Art
 2250 Public Service Technology
 2260 Community Services Technology
 2270 Labor Studies
 2280 Hospitality Management
 2290 Legal Assisting Technology
 2420 Business Management Technology
 2430 Real Estate
 2440 Computer Programming Technology
 2520 Marketing and Sales Technology
 2540 Office Administration
 2560 Transportation
 2730 Histotechnology
 2740 Medical Assisting
 2760 Radiologic Technology
 2770 Surgical Assisting
 2780 Allied Health
 2790 Respiratory Care
 2840 Chemical Technology
 2860 Electronic Technology
 2870 Automated Manufacturing Technology
 2880 Manufacturing Technology
 2900 Instrumentation Technology

2920 Mechanical Technology
 2940 Drafting and Computer Drafting Technology
 2980 Surveying and Construction Technology

Buchtel College of Arts and Sciences

3000 Cooperative Education	3460 Computer Science
3100 Biology	3470 Statistics
3110 Biology/N.E.O.U.C.O.M.	3480 General Mathematical Sciences
3120 Medical Technology	3500 Modern Languages
3130 Cytotechnology	3520 French
3150 Chemistry	3530 German
3200 Classics	3550 Italian
3210 Greek	3570 Russian
3220 Latin	3580 Spanish
3250 Economics	3600 Philosophy
3300 English	3650 Physics
3350 Geography	3700 Political Science
3370 Geology	3750 Psychology
3400 History	3850 Sociology
3450 Mathematics	3870 Anthropology
	3980 Urban Studies

College of Engineering

4100 General Engineering	4450 Engineering Computer Science
4200 Chemical Engineering	4600 Mechanical Engineering
4300 Civil Engineering	4800 Biomedical Engineering
4400 Electrical Engineering	4980 Construction Technology

College of Education

5000 Cooperative Education
 5100 Educational Foundations
 5200 Elementary Education
 5250 Reading
 5300 Secondary Education
 5400 Technical and Vocational Education
 5550 Physical Education
 5560 Outdoor Education
 5570 Health Education
 5600 Educational Guidance and Counseling
 5610 Special Education
 5620 School Psychology
 5630 Multicultural Education
 5700 Educational Administration
 5800 Special Educational Programs
 5850 Educational Technology
 5900 Higher Education Administration

College of Business Administration

6000 Cooperative Education	6500 Management
6200 Accountancy	6600 Marketing
6400 Finance	6800 International Business

College of Fine and Applied Arts

7000 Cooperative Education
 7100 Art
 7400 Home Economics and Family Ecology
 7500 Music
 7510 Musical Organizations
 7520 Applied Music
 7600 Communication
 7700 Communicative Disorders
 7750 Social Work
 7800 Theatre
 7810 Theatre Organizations
 7900 Dance
 7910 Dance Organizations
 7920 Dance — Performance

College of Nursing

8000 Cooperative Education
 8200 Nursing

School of Law

9200 Law

College of Polymer Science and Polymer Engineering

9841 Polymer Engineering
 9871 Polymer Science

*A more detailed explanation of the numbering system can be found in "Course Numbering Systems," Section 3 in this Bulletin.

Interdisciplinary Programs

DIVORCE MEDIATION

1800:

- 601 DIVORCE MEDIATION** 3 credits
Prerequisite: Admission to the Graduate Certificate Program on Divorce Mediation. Overview of divorce mediation process includes guidelines for negotiating separation and divorce agreements, division of personal and real property, support, custody, and future plans.
- 602 DIVORCE MEDIATION PRACTICUM** 2 credits
Prerequisite: 601. Practical application of divorce mediation procedures. Review of strategies and ethical considerations.

HOME-BASED INTERVENTION THERAPY

1820:

- 603 HOME-BASED INTERVENTION THEORY** 3 credits
Prerequisite: Admission to Certificate Program. Overview of home-based intervention to include philosophy and description of this programming as well as assessment of family, their home and community environment.
- 604 HOME-BASED INTERVENTION TECHNIQUES AND PRACTICE** 3 credits
Prerequisite: 603. Provides intervention techniques and skill areas required for home-based intervention and learning opportunities for matching techniques with specific family problems.
- 605 HOME-BASED INTERVENTION INTERNSHIP** 3-5 credits
Prerequisite: 604. Gives students the opportunity to apply knowledge of home-based intervention in actual delivery process working with families in their homes under the direct supervision of trained, experienced home-based intervention therapists.

ENVIRONMENTAL STUDIES

1830:

- 590 WORKSHOP IN ENVIRONMENTAL STUDIES** 1-4 credits
Prerequisite: varies with topic. Credit in graduate program must have prior approval of adviser. Skills, attitudes and fundamental concepts dealing with timely environmental problems and issues covered. Instruction under direction of University faculty.
- 602 EVALUATION OF ENVIRONMENTAL DATA** 3 credits
Prerequisites: graduate standing, one year of chemistry, physics, job experience or course work in chemical engineering. A review of environmental testing techniques in current use; emphasis on interpretation and limitations.
- 661 GRADUATE SEMINAR IN ENVIRONMENTAL STUDIES** 3 credits
Prerequisite: graduate standing. Explores topics of current environmental concerns. Emphasis on presentation of oral and written reports and subsequent student-faculty dialogue.

WOMEN'S STUDIES

1840:

- 585 SPECIAL TOPICS IN WOMEN'S STUDIES** 1-3 credits
(May be repeated). Specialized topics and current issues in Women's Studies. Covers content and issues not currently addressed in other academic courses. Emphases will be on original source materials, critical analyses and the synthesis of empirical and theoretical aspects.
- 590 WORKSHOP** 1-3 credits
(May be repeated). Group experiential study of special issues in Women's Studies.

INSTITUTE FOR LIFE-SPAN DEVELOPMENT AND GERONTOLOGY

1850:

- 680 INTERDISCIPLINARY SEMINAR IN LIFE-SPAN DEVELOPMENT AND GERONTOLOGY** 3 credits
Prerequisite: permission. The certificate program student only. Explores interdisciplinary issues in life-span development and gerontology. Guest speakers from various disciplines and services which have life-span development and gerontological components and from government and community facilities and services.
- 685 SPECIAL TOPICS** 1-3 credits
Prerequisite: permission of instructor. Specialized topics and current issues in life-span development, gerontology or gender. Emphasis is on original source materials, critical analyses and syntheses of empirical, theoretical and applied aspects.
- 686 RETIREMENT SPECIALIST** 2 credits
An investigation of issues related to the design and implementation of pre-retirement planning and examination of life-span planning education as employed by labor, business and education.
- 690 WORKSHOP** 1-3 credits
(May be repeated) Group studies of special topics in life-span development and gerontology. May be used as elective credit but not as part of certificate required courses.
- 695 PRACTICUM IN LIFE-SPAN DEVELOPMENT AND GERONTOLOGY** 3 credits
Prerequisite: permission. Supervised experience in research or community agency work.

MEDICAL STUDIES

1880:

- 501 SPECIAL TOPICS: MEDICAL EDUCATION** 1-3 credits
(May be repeated with a change of topic with a maximum of three credits toward graduation.) Prerequisites: upper-college student status and permission. Selected topics on medical education offered by professionals. Intended to provide advanced undergraduate education and continuing education for student and practitioners in the health sciences.

Buchtel College of Arts and Sciences

BIOLOGY

3100:

- 500 FOOD PLANTS** 2 credits
Prerequisite: 311 or permission of instructor. A survey of the plants used for human food, including their history, structure, uses.
- 521 TROPICAL FIELD BIOLOGY** 4 credits
Prerequisites: 111/112 or equivalent. Ecology of coral reefs, tide pools, mangroves, intertidal zones, terrestrial flora and fauna, island biogeography. Taught at a field station in the tropics.
- 522 CONSERVATION OF BIOLOGICAL RESOURCES*** 4 credits
Prerequisite: 217 or permission. Basic principles for management of plant and animal resources and natural areas. Political, economic and social aspects of resource management. Laboratory with field trips.
- 524 FRESHWATER ECOLOGY*** 3 credits
Prerequisite: 217. Field, laboratory study of lake ecosystems. Species composition of selected biotic communities, community energetics, nutrient cycling. Limnological survey of a local lake. Laboratory.
- 525 FRESHWATER ECOLOGY FIELD AND LABORATORY STUDIES** 3 credits
Prerequisite: 217 or permission of instructor. Field and laboratory studies of local lakes, ponds, and reservoirs. Collection, identification, and ecology of aquatic plants and animals, especially phytoplankton, zooplankton and benthic organisms.
- 526 APPLIED AQUATIC ECOLOGY*** 3 credits
Prerequisite: permission. Biological methods for assessing quality of natural waterways. Emphasis given to use of benthic invertebrates as indices of water quality. Laboratory.
- 528 BIOLOGY OF BEHAVIOR** 2 credits
Prerequisites: 211, 217 and 316. Biological basis of behavior: ethological theory; function, causation, evolution and adaptiveness of behavior. May be taken without 429/529.
- 529 BIOLOGY OF BEHAVIOR LABORATORY** 2 credits
Prerequisites or corequisites: 428/528 and permission of instructor. Individualized, directed study to provide the student with firsthand experience in observing, describing and interpreting animal behavior.
- 531 GENERAL MICROBIAL PHYSIOLOGY** 2 credits
Prerequisites: 331 or permission. Physiology of microscopic eucaryotes archaeobacteria, and eubacteria.
- 532 ADVANCED GENERAL BACTERIOLOGY** 4 credits
Prerequisite: 331. Study of the groups of bacteria involved in the production of food or chemicals, those found in soil and water and those involved in microbial biogeochemical cycles. Laboratory.
- 533 PATHOGENIC BACTERIOLOGY** 4 credits
Prerequisite: 331 and prerequisite or corequisite 437. Study of major groups of bacteria which produce infections in humans. Biochemical properties of microorganisms which engender virulence and nature of host resistance. Laboratory.
- 535 VIROLOGY** 4 credits
Prerequisite: 331. Physical, chemical and biological properties of viruses including mechanisms of infection, genetics and tumor formation; methods of cultivation and identification. Laboratory.
- 537 IMMUNOLOGY** 4 credits
Prerequisite: 331; recommended: 433. Nature of antigens, antibody response and antigen-antibody reactions. Site and mechanism of antibody formations, hypersensitivity, immunologic tolerance and immune diseases considered. Laboratory.
- 540 MYCOLOGY** 4 credits
Prerequisite: 112. Structure, life history, classification of representative fungi with emphasis on the importance of fungi to humans. Laboratory.
- 541 PLANT DEVELOPMENT** 4 credits
Prerequisites: 112 and one year of organic chemistry. Embryology and morphogenesis of plants in relation to physical, chemical, genetic and spatial factors. Laboratory.
- 542 PLANT ANATOMY** 3 credits
Prerequisite: 112. Structure and development of cells, tissues, organs and organ systems of seed plants. Laboratory.
- 543 PHYCOLOGY** 4 credits
Prerequisite: 112. Examination of the major groups of algae with emphasis on life histories and their relationship to algal form and structure. Laboratory.
- 545 PLANT MORPHOLOGY*** 4 credits
Prerequisite: 112. Structure, reproduction, life cycles, ecology, evolution, economic significance of land plants-bryophytes, club-mosses, whisk ferns, horsetails, ferns, seed plants. Laboratory.
- 547 PLANT PHYSIOLOGY** 3 credits
Prerequisites: 112 and one year of organic chemistry. Water, soil and mineral requirements of plants, and their metabolism, growth and response to internal and external stimuli. Laboratory.
- 548 ECONOMIC BOTANY** 2 credits
Prerequisite: 111/112 or instructor's permission. A survey of economically important plants and plant products, excluding food plants. Includes wood and fiber, dyes, drugs, resins, latex and other extractives.

*Field trips involved; minor transportation costs.

- 550 ANIMAL PESTS AND VECTORS** 3 credits
Prerequisite: 217 or permission of instructor. Study of the biology and control of disease vectors and urban pests. Laboratory.
- 551 GENERAL ENTOMOLOGY** 4 credits
Prerequisites: 112, 217. Structure, physiology, life cycles, economic importance and characteristics of orders and major families of insects. Laboratories parallel lectures.
- 553 INVERTEBRATE ZOOLOGY** 4 credits
Prerequisites: 112, 217. Invertebrate groups, their classification, functional morphology, adaptive radiation and life history. A phylogenetic approach is used. Laboratories parallel lectures.
- 554 PARASITOLOGY** 4 credits
Prerequisites: 112, 3150:201. Principles of parasitism; host parasite interactions; important human and veterinary parasitic diseases; and control measures. Laboratories parallel lectures.
- 556 ORNITHOLOGY*** 4 credits
Prerequisite: 112. Introduction to biology of birds: classification, anatomy, physiology, behavior, ecology, evolution, natural history and field identification. Laboratory.
- 558 VERTEBRATE ZOOLOGY** 4 credits
Prerequisite: 316 or permission. Biology of vertebrates, except birds — evolution, ecology, behavior, systematics and anatomy. Laboratory with field trips.
- 561,2 HUMAN PHYSIOLOGY** 4 credits each
Prerequisite: senior or graduate standing. Detailed study of function of the human body with special emphasis on neuromuscular, cardiovascular, respiratory, renal and endocrine physiology. Laboratory.
- 564 GENERAL AND COMPARATIVE PHYSIOLOGY** 4 credits
Prerequisites: 112 and one year of organic chemistry. Study of cellular, osmoregulatory, respiratory, cardiovascular, endocrine and neural mechanisms involved in understanding physiology of variety of invertebrate and vertebrate animals. Laboratory.
- 565 ADVANCED CARDIOVASCULAR PHYSIOLOGY** 3 credits
Prerequisite: 462 or 562 or permission. Study of biological mechanisms involved in heart attack, strokes, fluid balance, hypertension and heart disease. Controversial issues in each area will be examined and current research presented.
- 566,7 DEVELOPMENTAL ANATOMY** 4 credits each
Prerequisite: 112. Sequence designed to introduce process of vertebrate development. Lecture and laboratory work includes descriptive and experimental embryology, phylogenetic development of major vertebrate orders and individual study research. Laboratory.
- 568 THE PHYSIOLOGY OF REPRODUCTION** 3 credits
Prerequisite: 462/562 or permission. Study of the physiological mechanisms of reproduction throughout the animal kingdom with special emphasis upon mammalian endocrinological control. Controversial issues in the field will be examined and current research presented.
- 569 RESPIRATORY PHYSIOLOGY** 3 credits
Prerequisites: 462/562 or 464/564 or permission. Study of mechanisms determining gas exchange including mechanics, ventilation, blood flow, diffusion, and control systems. Emphasis is given to normal human lung function. (Clinical aspects are not considered in detail.)
- 580 RADIATION BIOLOGY*** 3 credits
Prerequisite: permission. Principles of radioactivity, interaction with matter, particularly its effects on biological systems. Detection devices, radiation safety and dosimetry, use of radio-labeled compounds in laboratory. Laboratory.
- 581 ADVANCED GENETICS** 3 credits
Prerequisite: 211. Nature of the gene; genetic codes; hereditary determinants; mutagenesis and genes in population. Lecture and seminar.
- 584 PHARMACOLOGY** 3 credits
Prerequisite: 311; recommended: college-level physiology. Interactions of drugs and living systems with emphasis on molecular and cellular mechanisms of action, drug metabolism and excretion, and selected aspects of environmental toxicology. Clinical aspects and specific drug therapies not considered in detail.
- 594 WORKSHOP IN BIOLOGY** 1-3 credits
(May be repeated) Prerequisite: permission of instructor. Group studies of special topics in biology. May not be used to meet undergraduate or graduate major requirements in biology. May be used for elective credit only.
- 597,8 BIOLOGICAL PROBLEMS** 1-2 credits each
Prerequisite: permission. Honors-level work, usually consisting of laboratory investigations.
- 631 EXPERIMENTAL BACTERIAL PHYSIOLOGY** 4 credits
Prerequisite: 531 or permission of instructor. Basic techniques peculiar to study of microbial physiology and modification of selected biochemical techniques for application to microbial systems. Laboratory.
- 660 ENVIRONMENTAL PHYSIOLOGY** 3 credits
Prerequisites: 561, 562. Study of physiological reactions of healthy mammals to natural changes or extremes of physical environment.
- 661 CYTOLOGY** 3 credits
Prerequisite: 311. Structure and functional organization of cells at ultrastructural level. Three lecture hours a week.
- 665 ANIMAL TISSUE CULTURE** 3 credits
Tissue culture techniques; biology and physiology of animal cells and tissues under in vitro conditions; application of these techniques to radiobiology, cancer chemotherapy and animal cell genetics. Laboratory.
- 686,7 RESEARCH IN THE BIOLOGY OF AGING** 3 credits each
Sequential. Prerequisite: graduate standing in biology, or by approval in related fields. Introduction to research techniques in study of biological aspects of aging and experience in special research project in the field.
- 688 PRINCIPLES OF TRANSMISSION ELECTRON MICROSCOPY** 3 credits
Prerequisite: 311 or 681 or equivalent. Modern cytological methods using transmission electron microscope. Portfolio required to demonstrate proficiency in fixation techniques, use of ultramicrotome, light and electron microscopes and darkroom techniques.
- 689 PRINCIPLES OF SCANNING ELECTRON MICROSCOPY** 3 credits
Prerequisites: 311, 681 or equivalent. An introduction of modern cytological methods using the scanning electron microscope. A portfolio is required to demonstrate proficiency in fixation techniques, the use of supplemental equipment such as the critical point drying apparatus and the sputter-coating apparatus and the efficient use of the scanning electron microscope.

*Field trips involved; minor transportation costs.

- 695 SPECIAL TOPICS: BIOLOGY** 1-3 credits
(May be repeated) Prerequisite: permission. Special courses offered once or only occasionally in areas where no formal course exists.
- 697,8 BIOLOGY COLLOQUIUM** 1 credit each
(May be repeated) Prerequisite: permission. Attendance at all departmental seminars and presentation of seminar based on original research. Required of all thesis option students who shall present their thesis research.
- 699 MASTER'S RESEARCH** 1-6 credits
(May be repeated) A minimum of six credits is required for thesis option student.

BIOLOGY/NEOUCOM

3110:

- 620 MICROSCOPIC ANATOMY** 4 credits
Prerequisites: graduate standing, permission and cell biology; histology suggested. Morphological basis for normal and disturbed functions; structure-function relationships in human microscopic anatomy. Lectures, special laboratory, learning techniques using human tissues.
- 630 HUMAN GROSS ANATOMY AND EMBRYOLOGY** 3 credits
Prerequisites: graduate standing and permission. An intensive survey of human macromorphology.
- 631 HUMAN GROSS ANATOMY AND EMBRYOLOGY LABORATORY** 3 credits
Corequisite: 630. An intensive survey of human macromorphology.
- 641 FUNCTIONAL NEUROANATOMY** 6 credits
Prerequisite: permission or graduate standing. Study of structure and function of mammalian nervous system with emphasis on human brain and human behavior. Laboratory.
- 643 NEUROPHYSIOLOGY** 4 credits
Prerequisite: 641. The relation of aspects of the neurosciences to the fundamental properties of nervous tissue, establishing a firm base in experimental neurobiology. Laboratory.
- 680 RADIOISOTOPES IN MEDICINE** 1 credit
Prerequisite: permission or graduate standing. A survey of the use of radioisotopes in medicine and research. Successful completion of this course qualifies the student for approval by the Nuclear Regulatory Commission for use of radioisotopes in research. Laboratory.
- 895 SPECIAL TOPICS: BIOLOGY/NEOUCOM** 1-6 credits
Prerequisite: permission of instructor. Advanced topics in medical education covering areas not otherwise available. May be repeated with a change in topic.

CHEMISTRY

3150:

- 501 BIOCHEMISTRY LECTURE I** 3 credits
Prerequisite: 264. Biochemistry of amino acids, carbohydrates, lipids, and nucleic acids: structure/function relations. Enzymes as catalysts: kinetics and regulation. Cofactors.
- 502 BIOCHEMISTRY LECTURE II** 3 credits
Prerequisite: 401/501. Overview of metabolism; thermodynamics; carbohydrate, fatty acid, amino acid, and nucleoside anabolism and catabolism; hormonal control of metabolism. Photosynthesis.
- 505 BIOCHEMISTRY LABORATORY** 2 credits
Prerequisite: 401/501. Methods for separation and analysis of amino acids, proteins, carbohydrates, lipids, and nucleic acids and their metabolism. Chromatography, electrophoresis, centrifugation, spectrophotometry and use of radioisotopes.
- 508 THE PROFESSIONAL CHEMIST IN INDUSTRY** 2 credits
Prerequisite: senior year or degree in chemistry or chemical engineering or permission. Business, legal, societal, economic and other nonchemical aspects of a chemist's profession.
- 511 PHYSICAL CHEMISTRY FOR BIOLOGY MAJORS** 3 credits
Prerequisites: 266 and 3450.148 and permission. Gases, thermodynamics, electrochemistry, chemical kinetics, macromolecules and colloids; special topics in biochemistry, biophysics and molecular biology.
- 521 QUALITATIVE ORGANIC ANALYSIS** 4 credits
Prerequisite: 266. Identification and characterization of organic substances, separation and identification of components of organic mixtures. Laboratory.
- 572 ADVANCED INORGANIC CHEMISTRY** 3 credits
Prerequisite: 304 or 314. Concepts of atomic structure integrated in systematic classification of elements. Periodic table. Chemistry of the representative elements. Transition elements including coordination compounds, organometallics and metal carbonyls.
- 590 WORKSHOP IN CHEMISTRY** 1-3 credits
(May be repeated) Group studies of special topics in chemistry. May not be used to meet undergraduate or graduate major requirements in chemistry.
- 601,2 CHEMISTRY OF POLYMERS I, II** 2 credits each
Sequential. Prerequisites: 264 and 266 or permission of instructor. History, classification and nomenclature; natural polymers. Types and methods of polymerization. Ring vs. chain stability. Natural and synthetic polypeptides, nucleic acids.
- 604,5 CHEMISTRY OF POLYMERS LABORATORY I, II** 2 credits each
Sequential. Prerequisites: 264, 266. Preparation, identification of polymers to illustrate polymerization methods in 601, 602, 649.
- 610 BASIC QUANTUM CHEMISTRY** 3 credits
Prerequisite: 314 or permission of instructor. Quantum mechanics with applications to molecular systems. Includes angular momentum, molecular hamiltonians, variation and perturbation methods and molecular orbital theories.
- 811 SPECTROSCOPY** 3 credits
Prerequisite: 610 or permission of instructor. Interaction of light with matter, linear and nonlinear spectroscopies. Rotational, vibrational and electronic spectroscopy. Radiationless transitions and photochemistry.
- 621 ADVANCED PREPARATIONS** 1-2 credits
Prerequisite: permission. Methods for preparing and purifying organic and inorganic compounds. Laboratory.
- 625 CHEMISTRY SEMINAR** 1 credit
Lectures on current research topics in chemistry by invited speakers.
- 629,30 THEORETICAL INORGANIC CHEMISTRY I, II** 2 credits each
Sequential. Prerequisites: 314, 472 or permission. Detailed treatment of chemistry of transition elements. Group theoretical applications, ligand field theory, kinetics and mechanism, magnetism, electronic spectra, molecular orbital theory.
- 635 THERMODYNAMICS AND STATISTICAL THERMODYNAMICS** 3 credits
Prerequisites: 313 and 314 or permission of instructor. Rigorous treatment of laws of thermodynamics and their applications to selected chemical systems. Fundamentals of statistical thermodynamics and applications to systems in chemical equilibrium.
- 636 CHEMICAL KINETICS** 3 credits
Prerequisites: 635 or permission of the instructor. Phenomenological kinetics, experimental methods of investigation and analysis of reaction systems. Theoretical treatments of reaction rates.
- 674,5 PHYSICAL CHEMISTRY OF POLYMERS I, II** 2 credits each
Sequential. Prerequisite: 314 or permission of instructor. Basic statistical ideas. Molecular weights, distributions, sizes and shapes; kinetics and mechanism of polymerization; copolymerization; degradation; thermodynamics of polymer solutions.
- 685,6 EXPERIMENTAL PHYSICAL CHEMISTRY OF POLYMERS I, II** 2 credits for 685; 2-3 credits for 686
Sequential. Prerequisites or corequisites: 674, 675, respectively. Laboratory to illustrate methods and principles discussed in 674 and 675.
- 699 MASTER'S RESEARCH CHEMISTRY** 1-6 credits
For properly qualified candidates for master's degree. Supervised original research in analytical, inorganic, organic, physical or biochemistry.
- 701 CHEMICAL LITERATURE** 2 credits
Prerequisite: permission. Online searching of chemical databases. Major emphasis is placed on chemical abstracts, but other databases are included. Lecture and online searching.
- 710 SPECIAL TOPICS: ANALYTICAL CHEMISTRY** 1-3 credits
(May be repeated) Prerequisite: permission. Topics in advanced analytical chemistry. Electroanalysis, activation analysis, atomic absorption spectrometry, mass spectrometry, liquid-liquid, liquid-solid and gas chromatography, ion exchange, thermoanalytical methods, separations, standards, sampling, recent developments.
- 711 SPECIAL TOPICS: INORGANIC CHEMISTRY** 1-3 credits
(May be repeated) Prerequisite: permission. Consideration of topics in modern inorganic chemistry such as coordination compounds, chemistry of the solid state, representative elements, nonaqueous solvents, organometallic compounds, homogeneous catalysis.
- 712 SPECIAL TOPICS: ORGANIC CHEMISTRY** 1-3 credits
(May be repeated) Prerequisite: permission. Topics in advanced organic chemistry such as natural products, heterocyclic compounds, photochemistry.
- 713 SPECIAL TOPICS: PHYSICAL CHEMISTRY** 1-3 credits
(May be repeated) Prerequisite: permission. Subject from modern physical chemistry.
- 714 SPECIAL TOPICS: POLYMER CHEMISTRY** 1-2 credits
(May be repeated) Prerequisites: 264, 266, 314, 316 or permission. Study of topical subjects of current interest. Chemistry of macromolecules encompassing organic, inorganic or physical chemistry aspects and including laboratory work where applicable. Lectures and/or laboratory.
- 715 SPECIAL TOPICS: BIOCHEMISTRY** 1-3 credits
(May be repeated) Prerequisite: permission. Consideration of topics in biochemistry such as isoenzymes and disease, genetic engineering, membrane structure and functions and recent developments in field.
- 720 ADVANCED BIOCHEMICAL TECHNIQUES** 3 credits
Prerequisite: 402/502. An advanced lecture course on physical techniques in biochemistry. Includes optical and hydrodynamic methods; radioanalytical techniques, scattering and magnetic resonance spectroscopy.
- 722 ENZYMIC REACTIONS** 3 credits
Prerequisite: 401/501, 402/502 or permission. Mechanisms of enzyme catalyzed reactions, general aspects and specific examples for phosphoryl, acyl, glycosyl transfers, eliminations, oxidation/reduction, isomerization and rearrangements. Chemistry of cofactors.
- 724 BIOINORGANIC CHEMISTRY** 3 credits
Prerequisite: 401/501, 402/502, and 472/572. Survey of the structure and properties of metal ion complexes with amino acids, nucleotides, metabolites and macromolecules; metal ion metabolism; metals in medicine.
- 726 ADVANCED METABOLISM** 3 credits
Prerequisites: 401/501 and 402/502. Study of advanced pathways in carbohydrate, lipid and protein metabolism with emphasis placed on metabolic dysfunction.
- 899 DOCTORAL RESEARCH CHEMISTRY** 1-16 credits
Open to qualified student accepted as a candidate for Doctor of Philosophy in Chemistry. Supervised original research undertaken in organic, inorganic, physical, analytical or biochemistry.

CLASSICS

3200:

- 501,2 EGYPTOLOGY I AND II** 3 credits each
The history and antiquities of ancient Egypt.
- 504,5 ASSYRIOLOGY** 3 credits each
(May be repeated for credit with another cuneiform language) Prerequisite: permission of instructor. The Akkadian language.
- 507,8 ANCIENT NEAR EASTERN ARCHAEOLOGY** 3 credits each
(May be repeated for credit with change of subject) Prerequisite: permission of instructor. Palestine, Mesopotamia, Asia Minor, adjacent lands; Old Testament in light of material evidence.
- 550 SELECTED TOPICS IN ANCIENT CULTURES** 3 credits
(May be repeated with change of subject) Varied offerings in literature, art and archaeology and religion. No foreign language necessary.
- 590 WORKSHOP IN CLASSICS** 1-3 credits
(May be repeated with change in topic). Group studies of special topics in Classics. Cannot be used to fulfill undergraduate major requirements in Classics; for elective credit only.

- 597,8 READING AND RESEARCH IN THE ANCIENT NEAR EAST** 1-3 credits
Prerequisite: permission of instructor. Advanced work in various aspects of Ancient Near Eastern Studies (Archaeology, Assyriology, Egyptology, etc.).

GREEK

3210:

- 597,8 GREEK READING AND RESEARCH** 3 credits each
(May be repeated for credit with change of subject) Prerequisite: permission of instructor. Homer, Sophocles, Plato or the like.

LATIN

3220:

- 597,8 LATIN READING AND RESEARCH** 3 credits each
(May be repeated for credit with change of subject) Prerequisite: permission of instructor. Generally Latin epigraphy, prose composition or philology; numismatics or certain other archaeological topics may be offered.

ECONOMICS

3250:

- 506 STATE AND LOCAL PUBLIC FINANCE** 3 credits
Prerequisite: 410; recommended: 405. Examines economic rationale and problems for provision of goods and services by different governmental units. Considers alternative revenue sources and special topics.
- 527 ECONOMIC FORECASTING** 3 credits
Prerequisite: 3470:460, 461 or permission of instructor. Study of methods for building, identifying, fitting and checking dynamic economic models and the use of these models for forecasting. Emphasis is on the application of available computer software systems.
- 530 LABOR MARKET POLICY** 3 credits
Prerequisites: 330 or 333. Intensive study of current labor market policy issues (e.g., discrimination, poverty, the changing industrial structure, and the economics of education).
- 535 THE DEVELOPMENT OF AMERICAN CORPORATE STRUCTURE** 3 credits
Traces evolution of American corporate structure from late 19th Century to present. Explains and analyzes changing dimensions of corporate structure and response of government. Case studies analyzed.
- 540 SPECIAL TOPICS: ECONOMICS** 3 credits
Prerequisite: permission. Opportunity to study special topics and current issues in economics.
- 550 COMPARATIVE ECONOMIC SYSTEMS** 3 credits
Prerequisites: 201, 202 or permission of instructor. Systems of economic organization, ranging from the theoretical extreme of a perfectly free market economy to the socialist varieties. Historical evolution of economic systems covering problems in theory and practice.
- 560 ECONOMIC DEVELOPMENT AND PLANNING FOR UNDERDEVELOPED COUNTRIES** 3 credits
Prerequisites: 201, 202. Basic problems in economic development. Theories of development. Government planning for development. Trade and development of underdeveloped countries. No credit for graduate majors in economics.
- 575 DEVELOPMENT OF ECONOMIC THOUGHT** 3 credits
Prerequisites: 201, 202. Evolution of theory and method, relation of ideas of economists contemporary to conditions.
- 581 MONETARY AND BANKING POLICY** 3 credits
Prerequisites: 380, 400. Control over currency and credit, policies of control by central banks and governments, United States Treasury and Federal Reserve System.
- 591 WORKSHOP IN ECONOMICS** 1-3 credits
(May be repeated) Group studies of special topics in economics. May not be used to meet undergraduate or graduate major requirements in economics. May be used for elective credit only.
- 600 FOUNDATIONS OF ECONOMIC ANALYSIS** 3 credits
Prerequisite: graduate standing. Determination of national income, employment and price level; aggregate consumption, investment and asset holding; decision problems faced by household and firm. Partial equilibrium analysis of competition and monopoly and general equilibrium analysis. May not be substituted for 602, 603, 611, or applied toward the 30 graduate credits required for M.A. in economics.
- 602 MACROECONOMIC ANALYSIS I** 3 credits
Construction of static macroeconomic models. Analysis predominantly in terms of comparative statics with only relatively brief mention of dynamic models.
- 603 MACROECONOMIC ANALYSIS II** 3 credits
Prerequisite: 602. Macrodynamics and stability analysis of closed and open Keynesian systems. Inclusive coverage of post-Keynesian theories of economic growth.
- 606 ECONOMICS OF THE PUBLIC SECTOR** 3 credits
Examination of public sector economies emphasizes public revenues, public expenditures. Develops objectives of taxation, welfare aspects of the public sector, theory of public goods. Considers specific taxes, cost-benefit analysis, expenditures analysis, fiscal federalism.
- 610 FRAMEWORK OF ECONOMIC ANALYSIS** 3 credits
Prerequisite: graduate standing. Development of theoretical and analytical framework for decision making. Discussion of applications of the framework to situations concerning demand, cost, supply, production, price, employment and wage.
- 611 MICROECONOMIC THEORY I** 3 credits
Modern theory of consumer behavior and of the firm. Determination of market prices. Optimization models, establishment of criteria for productive, allocative and distributive efficiency.
- 612 MICROECONOMIC THEORY II** 3 credits
Prerequisite: 611. Continuation of 611. Covers multimarket equilibrium, general equilibrium and welfare economic theory, and applications in public choice and applied welfare theory.

- 615 INDUSTRIAL ORGANIZATION** 3 credits
Prerequisite: 611 or permission. Examines link between market structure, firm conduct and economic performance. Measurement and effects of monopoly power, industrial concentration and changes.
- 616 ANTITRUST ECONOMICS** 3 credits
Prerequisite: 615 or permission of instructor. Economic rationale behind legislative and judicial decisions affecting mergers, vertical, horizontal restraints, monopolization, collusion, price discrimination.
- 617 THE ECONOMICS OF REGULATION** 3 credits
Prerequisite: 615 or permission of instructor. Examines rationale, methods and success of government regulation of public utility, transportation and communications industries.
- 620 APPLICATIONS OF MATHEMATICAL MODELS TO ECONOMICS** 3 credits
Prerequisites: courses in calculus, intermediate microeconomics or permission of the instructor. Review of selected topics of differential and integral calculus and their application to economic analysis. Theory of optimization in production and consumption; static macroeconomic models. Analysis of growth and stability.
- 621 APPLICATION OF LINEAR MODELS IN ECONOMIC ANALYSIS** 3 credits
Prerequisites: courses in intermediate microeconomics. Review of selected topics of linear algebra, application to economic theory. Static open and closed input-output tables, dynamic models, consumption technology and theory of demands, linear programming, general equilibrium analysis.
- 626 STATISTICS FOR ECONOMETRICS** 3 credits
Prerequisites: courses in elementary differential and integral calculus, 6500:321, 322 or equivalent. A review of statistical theory and its application to research in economics. Emphasis is on estimation and hypothesis testing as a prelude to econometrics.
- 627 ECONOMETRICS** 3 credits
Prerequisite: 626 or equivalent. Formulation of functional relations among economic variables suitable for statistical estimation from observational data and construction of multiequation econometric models and methods of estimation.
- 628 SEMINAR IN RESEARCH METHODS** 3 credits
Prerequisite: permission of instructor. A seminar in the research use of applied mathematical economics or econometrics. Emphasis is on individual development of a theoretical proposition or research statement, its empirical examination and policy implications.
- 633 THEORY OF WAGES AND EMPLOYMENT** 3 credits
Analytical approach to integration of economic theory with observed labor market phenomena. Discussion of wage and employment theories, effects of unions, collective bargaining theories and effects of government regulation.
- 634 COLLECTIVE BARGAINING** 3 credits
Economic issues and implications involved in hours of work, employment and unemployment, and the impact of trade unions upon basic institutions of a free private enterprise economy.
- 635 LABOR LAW** 3 credits
Evaluation of labor relations laws. Public policy affecting public, private worker organizations; collective bargaining; strikes; picketing.
- 636 COLLECTIVE BARGAINING II** 3 credits
Prerequisite: 635 or permission of instructor. Examination of process of negotiation. Course core is an actual contract negotiation. Student decides on issues, positions and tactics, then negotiates contract.
- 637 EMPLOYMENT LAW** 3 credits
Study of selected aspects of legislation and case decisions affecting employer-employee relations. Topics include employment-at-will; health and safety; wage, hours and benefits; arbitration.
- 639 PUBLIC SECTOR LABOR MARKETS** 3 credits
Prerequisite: 635 or permission of instructor. Examination of unique problem of public employees under collective bargaining agreements. Focus on legal framework, tripartite nature of negotiations and special situations facing public employees.
- 664 SEMINAR ON ECONOMIC GROWTH AND DEVELOPMENT** 3 credits
Review of main theories of economic growth since age of classical economics. Problems in development of emerging countries. Discussion of aggregative macromodels of capital formation, investment, technology and external trade.
- 665 SEMINAR ON ECONOMIC PLANNING** 3 credits
Types, methods and applications of planning. Planning for growth. Application of input-output, linear programming, computer simulations and other statistical and mathematical methods of planometrics.
- 666 SEMINAR ON REGIONAL ECONOMIC ANALYSIS AND DEVELOPMENT** 3 credits
Study of a particular national or international regional development. Any one or a combination of following regions may be considered: Middle East, North Africa, areas within Latin America, Southern Europe, Southeast Asia or Eastern Europe.
- 670 INTERNATIONAL MONETARY ECONOMICS** 3 credits
International financial relations. Foreign exchange market and exchange rate adjustments. Balance of payments adjustment policies. International monetary system.
- 671 INTERNATIONAL TRADE** 3 credits
Traditional trade theory. Recent developments in trade theory, policy implications in trade relations among developed and developing economics.
- 683 MONETARY ECONOMICS** 3 credits
Intensive study of important areas of monetary theory. Emphasis on integration of money and value theory among other areas, plus some pressing policy issues.
- 697,8 READING IN ADVANCED ECONOMICS** 1-4 credits each
(A maximum of six credits may be applied toward the master's degree in economics.) Intensive investigation of selected problem area in advanced economics under supervision of instructor. Since the subject matter is decided upon in each case, the course may be taken repeatedly for credit.
- 699 RESEARCH AND THESIS** 3 credits
(May be repeated for a total of six credits)

ENGLISH

3300:

- 500 ANGLO SAXON** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Studies in Old English language and Old English prose and poetry, including *Beowulf*.

- 503 DEVELOPMENT OF THE ARTHURIAN LEGEND** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Traces evolution of Arthurian materials from 540 to 1500 and beyond, with emphasis on characters, themes, events and treatments.
- 506 CHAUCER** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Close study of Chaucer's major works — *The Canterbury Tales* and *Troilus and Criseyde* in Middle English.
- 507 MIDDLE ENGLISH LITERATURE** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Study of genres, topics, styles and writers of the Middle English literary works from 12th to 15th Centuries. Readings in Middle English.
- 512 SPENSER** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Close reading of major narrative and lyric poems and selections from the minor works, all studied in the context of Elizabethan aesthetic theory, learning and politics.
- 516 METAPHYSICAL POETS** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Selected 17th-Century British poets exclusive of John Donne. The course examines the particular styles and themes of the secular and sacred poets who wrote in the metaphysical mode. Particular emphasis is placed on Herbert, Crashaw, Vaughan, Traherne, Marvell, Cowley, Cleveland, Southwell and King.
- 518 MILTON** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Emphasis on Milton's major poems and prose works: *Paradise Lost*, *Paradise Regained*, *Areopagitica*, the divorce tracts and poems of the 1645 edition. Student becomes acquainted with Milton the man and Milton the artist.
- 521 SWIFT AND POPE** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. An intensive study of the major satires of Swift and Pope. Concentration on the rhetorical strategies of each author within the context of the shifting intellectual and cultural milieu at the end of the 17th and beginning of the 18th Centuries.
- 524 EARLY ENGLISH FICTION** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Development of English novel before 1830. Focus on works of Defoe, Richardson, Fielding, Smollett, Sterne, Austen and Scott.
- 525 STUDIES IN ROMANTICISM** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Literary, philosophical, psychological and social revolutions of romantic period as reflected in works of such major writers as Wordsworth, Byron and Keats.
- 530 VICTORIAN POETRY AND PROSE** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Poetry, prose of the late 19th Century, excluding fiction, with attention to Tennyson, Browning, Arnold, Carlyle, Ruskin and other major writers.
- 531 VICTORIAN FICTION** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Reading of at least five major novels of Victorian era, of varying length, by Emily Bronte, Dickens, Eliot, Thackeray and Hardy. Characterization, theme and attitude toward life emphasized.
- 534 CHARLES DICKENS** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Growth of Dickens as a novelist, with attention to the social and political backgrounds of the novels and changes in their structure and treatment of character.
- 535 20TH CENTURY BRITISH POETRY** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Concentrated study of major poems of Yeats, Eliot and Auden, with attention also to Hardy, Housman, Spender, C. Day Lewis, Dylan Thomas and others.
- 536 BRITISH FICTION: 1900-1925** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Study of Conrad, Joyce, D. H. Lawrence and Virginia Woolf, with attention to their innovations in narrative and style, their psychological realism and symbolism. Brief consideration of other important fiction writers of the period, including Wells, Bennett and Mansfield.
- 537 BRITISH FICTION SINCE 1925** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Study of important British novelists since 1925, excluding Lawrence, Joyce and Woolf. Attention to development of British short story from 1925 to present.
- 539 MODERN BRITISH AND IRISH DRAMA** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Study of major British dramatists, principally those of post-World War II. Focal figures are Shaw, Galsworthy, O'Casey, Osborne, Arden and Pinter.
- 543 MELVILLE** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. A study of Herman Melville's life and works. Primary emphasis will be on Melville's major fiction (e.g., *Moby Dick*, *The Confidence Man*, *Billy Budd*), but some attention will also be given to his poetry and travel sketches.
- 546 AMERICAN AUTOBIOGRAPHY** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. An inquiry into the nature of autobiographical writing, with particular attention to the ontology of the "autobiographical self." Includes such authors as Henry Adams, Sherwood Anderson, Mark Twain, Gertrude Stein, Langston Hughes, William Carlos Williams, Loren Eiseley and Maya Angelou.
- 548 AMERICAN ROMANTIC FICTION** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Examination of early American fiction, tracing its genesis, romantic period and germinal movements toward realism. Writers discussed include Cooper, Poe, Hawthorne and Melville.
- 549 AMERICAN FICTION: REALISM AND NATURALISM** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Examination of American writers of realistic and naturalistic fiction (e.g., Howells, James, Crane, Dreiser), tracing developments in American fiction against background or cultural and historical change.
- 550 MODERN AMERICAN FICTION** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Study of significant American short and long fiction from World War I to the present.
- 551 AMERICAN POETRY TO 1900** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Survey of American poetry of the 17th, 18th and 19th Centuries.
- 552 MODERN AMERICAN POETRY** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Survey of 20th Century American poetry beginning with Edwin Arlington Robinson and ending with contemporary poets.
- 553 AMERICAN WOMEN POETS** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Study of modern poets' uses and revisions of tradition, treatment of relationships between women and men and between women, conceptions of art and of the artist-as-woman, and confrontation of the debate between "public" and "private" poetry.
- 554 20TH CENTURY AMERICAN DRAMA** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Examination of major, established playwrights (including O'Neill, Miller and Williams) and sampling of new and rising ones.
- 555 THE AMERICAN SHORT STORY** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. A study of the development of the short story as a particularly American genre, from Washington Irving to the present.
- 558 FAULKNER** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. An in-depth study of William Faulkner's major novels and short stories, primarily those set in the imaginary Yoknapatawpha region.
- 567 MODERN EUROPEAN FICTION** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Representative European writers from about 1850 to present, in translation. Focus on fiction of such writers as Zola, Tolstoy, Dostoyevsky, Mann, Proust, Kafka and Solzhenitsyn.
- 569 EROS AND LOVE IN EARLY WESTERN LITERATURE** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. An analysis of the use of sex and love in the literature of the Western World from Greco-Roman times to 1800, with special emphasis on how sexuality and "romantic" love are used as allegorical, satiric, fantastic or realistic devices.
- 570 HISTORY OF ENGLISH LANGUAGE** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Development of English language, from its beginnings: sources of its vocabulary, its sounds, its rules; semantic change; political and social influences on changes; dialect origins; correctness.
- 571 U.S. DIALECTS: BLACK AND WHITE** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Study of differences in pronunciation, vocabulary and grammar among U.S. language varieties. Origins, regional and social dimensions are explored. Correctness, focusing on black English and Appalachian speech, explored.
- 572 SYNTAX** 3 credits
Prerequisites: 371, and 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Principles of syntactic description. Sentence structures are investigated from a variety of languages, with emphasis on English.
- 573 SEMINAR IN TEACHING ESL: THEORY AND METHOD** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Theoretical issues in linguistic description and language acquisition as relevant to learning of a second language. Elaboration of principles for the teaching of English as a second language based on research in linguistics, psycholinguistics and second language pedagogy.
- 575 THEORY OF RHETORIC** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Ancient and modern theories of rhetoric, with attention to classical oration, "topics" of rhetoric and their application to teaching of English.
- 576 THEORY AND TEACHING OF BASIC COMPOSITION** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Review of current research and exploration of specific instructional methods for teaching basic composition.
- 563 FANTASY AND SCIENCE FICTION** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. Selected British and American fantasy and science fiction from the 1880s to the present.
- 584 FANTASY** 3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. A study of forms of literature, primarily fiction, based on and controlled by an overt violation of what is generally considered as possibility.
- 569 SEMINAR IN ENGLISH** 2-3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. (May be repeated with different topics.) Special studies, and methods of literary research, in selected areas of English and American literature and language.
- 590 WORKSHOP IN ENGLISH** 1-3 credits
Prerequisite: Completion of 1100:111 and 1100:112 or their equivalents, or permission of the instructor. (May be repeated with different topics) Group studies of special topics in English. Cannot be used to meet undergraduate or graduate major requirements in English; for elective credit only.
- 600 TEACHING COLLEGE COMPOSITION PRACTICUM** 2 credits
Prerequisite: teaching assistantship. Orientation and weekly analysis of teaching rationale and practice, limited to teaching assistants in the Department of English.
- 615 SHAKESPEAREAN DRAMA** 3 credits
Concentrated study of several Shakespearean plays with emphasis on historical, critical and dramatic documents pertinent to development of Shakespeare's art.
- 616 SHAKESPEARE'S CONTEMPORARIES IN ENGLISH DRAMA** 3 credits
Readings in such playwrights as Lyly, Greene, Marlowe, Jonson, Beaumont, Fletcher, Webster, Middleton and Ford and in contemporary writings relevant to theory and practice of drama.
- 627 KEATS AND HIS CONTEMPORARIES** 3 credits
Writings of John Keats, studied against background of romantic poetic theory and poetry of Keats' contemporaries.
- 639 THEORY AND PRACTICE OF MODERN POETRY** 3 credits
Study of modern prosody, critical theories of modern poetry and relation between writer's theory and practice, with particular attention to Frost, Stevens, Yeats and Eliot.
- 642 SEMINAR IN DICKINSON** 3 credits
An in-depth study of Dickinson's poetry, with special attention to her varied poetic identities and their relationships to her life, and an examination of some of the major critical approaches to her poetry.

- 643 SEMINAR IN JAMES** 3 credits
A study of Henry James' life and works. Primary emphasis will be on James' fiction, both long and short, early and late; but some attention will also be given to his literary criticism, travel pieces and plays.
- 665 LITERARY CRITICISM** 3 credits
Inquiry into nature and value of literature and problems of practical criticism as represented in major statements of ancient and modern critics.
- 670 MODERN LINGUISTICS** 3 credits
Introductory examination of methods and results of modern grammatical research in syntax, semantics, phonology and dialects. Goals include understanding of language variation and background preparation for linguistic studies of literature.
- 673 THEORIES OF COMPOSITION** 3 credits
Study of composition theories and research, with attention to their implications for writing and writing instruction. Particular focus on such topics as composing processes, invention, form, style, modes of writing, language varieties and evaluation of writing. Class sessions include discussion of readings and presentations.
- 674 RESEARCH METHODOLOGIES IN COMPOSITION** 3 credits
Research methodologies in composition and their application. Students will define research areas, summarize and evaluate work already done, and propose and complete semester research projects.
- 675 WRITING FOR MBAs** 3 credits
Emphasizes managerial writing. Writing tasks are presented as decision-making tools, and students develop strategies for messages to subordinates, analytical reports and messages to outside audiences.
- 679 SCHOLARLY WRITING** 3 credits
Study of composing, analyzing and evaluating academic arguments. Practice in specific forms of academic writing such as reviews of research, articles and book reviews.
- 683 SEMINAR IN SATIRE** 3 credits
A study of satire from the middle ages through the late 20th Century, with particular attention to techniques of satiric attack, modes of comedy and irony and literary criticism.
- 689 SEMINAR IN ENGLISH** 2-3 credits
(May be repeated with change of topics) Special topics within the general field of literature and language, usually focusing on major figures or themes.
- 691 BIBLIOGRAPHY AND LITERARY RESEARCH** 3 credits
Choosing research topics, typical problems in literary scholarship, abstracting of scholarly material and bibliographic sources for literary research. Bibliographic exercises done, models of literary scholarship read.
- 698 INDIVIDUAL READING IN ENGLISH** 1-3 credits
Individual study under guidance of professor who directs and coordinates student's reading and research.
- 699 THESIS** 1-6 credits
Original work in the field of literature and language and completion of graduate student's required thesis.

GEOGRAPHY

3350:

- 505 GEOGRAPHIC INFORMATION SYSTEMS** 3 credits
Prerequisites: six credits of advanced geography courses at the 300 level or above, but not including regional courses; or permission. Requirements and techniques for using all types of Geographic Information Systems (GIS). For students wishing to become applied geographers, physical and social scientists, resource managers, planners, environmental analysts.
- 522 TRANSPORTATION SYSTEMS PLANNING** 3 credits
Prerequisite: 320 or permission. Study and analysis of transportation systems from a geographic perspective. Emphasis on transportation problems and issues, elements of transportation planning.
- 528 INDUSTRIAL AND COMMERCIAL SITE LOCATION** 3 credits
Prerequisite: 320 or permission. Relationship between land, resources, population, transportation and industrial and commercial location process.
- 533 URBAN, REGIONAL AND RESOURCE PLANNING** 3 credits
Prerequisite: 330 or permission. Role of geographic investigation in city, regional and resource planning.
- 536 URBAN LAND USE ANALYSIS** 3 credits
Prerequisite: 330 or permission. Land use classification systems and their spatial variation in urban areas. Land use data are collected by student by field work and analyzed to identify the associations and structure of subregions.
- 538 WORLD METROPOLITAN AREAS** 3 credits
Prerequisite: 330 or permission. Comparative analysis of metropolitan regions. Urbanism, land use, housing, transportation, population and role of cities in economic development in different cultures.
- 542 THEMATIC CARTOGRAPHY** 3 credits
Prerequisite: 341 or permission. Principles and techniques used in thematic mapping. Stresses use of maps to indicate certain characteristics of classes of information both qualitative and quantitative.
- 544 MAP COMPILATION AND REPRODUCTION** 3 credits
Prerequisite: 341 or permission. Production of new/improved maps from existing maps, aerial photographs, surveys, new data and other sources. Includes special cartographic considerations for photography, lithography and printing.
- 547 INTRODUCTION TO REMOTE SENSING** 3 credits
Prerequisite: 341 or permission. Study of aerial photography and non-photographic imagery developed by radar, thermal, multispectral and satellite scanners. Emphasis on use in geographical, geological, biological and engineering research.
- 548 AUTOMATED COMPUTER MAPPING** 3 credits
Prerequisite: 341 or permission. Study of computer-assisted map compilation and execution. Emphasis on integration of computer and cartographic skills and techniques. Problems adapted to specialized interests of student.
- 549 ADVANCED REMOTE SENSING** 3 credits
Prerequisite: 447/547 or permission. Current research in remote sensing. Applications in study of human cultural and biophysical environment. Practice in planning, design, execution and interpretation of remote sensing studies.

- 550 DEVELOPMENT PLANNING IN THE THIRD WORLD** 3 credits
A study of planning concepts and techniques for developing countries, including growth and development, planning agencies, regional inequities and alternative approaches.
- 571 MEDICAL GEOGRAPHY AND HEALTH PLANNING** 3 credits
Spatial analysis of diseases; their socioeconomic correlates; diffusion pattern of infectious diseases with particular reference to North America; health-planning processes and spatial analysis of health-care delivery systems.
- 581 GEOGRAPHIC RESEARCH METHODS** 3 credits
Prerequisites: 12 credits in geography. Techniques in geographic research. Library resources, techniques of professional writing.
- 583 SPATIAL ANALYSIS** 3 credits
Prerequisite: 481/581 or permission. Analysis of mapped statistical surfaces. Principles for use of map as model for statistical evidence, prediction, hypothesis testing.
- 589 SPECIAL TOPICS IN GEOGRAPHY** 1-3 credits
(May be repeated) Selected topics of interest in geography.
- 590 WORKSHOP IN GEOGRAPHY** 1-3 credits
(May be repeated for a total of six credits) Group studies of special topics in geography.
- 595 SOIL AND WATER FIELD STUDIES** 3 credits
Prerequisite: 310 or permission. Properties, origins and uses of major soil and water regime landscapes. Stresses relationships between soil and the hydrological cycle, urbanization, suburbanization and agriculture. Field trips required.
- 596 FIELD RESEARCH METHODS** 3 credits
Prerequisite: 481/581 or permission. Field work enabling student to become competent in collecting, organizing and analysis of data while carrying out field research projects.
- 600,1,2 SEMINAR** 3 credits each
(May be repeated for a maximum of six credits each) Prerequisite: permission. Investigation and analysis of selected topics in particular fields of geography. Specialization indicated by second portion of title.
- 680 ADVANCED SPATIAL ANALYSIS** 3 credits
Prerequisite: 483/583 or permission. Advanced concepts and methodologies in geographic research. Emphasis on quantitative revolution in geographical analysis including multivariate procedures as factor, discriminant and economical analysis, and multidimensional scaling.
- 685 PLANNING: FIELD EXPERIENCE** 2 credits
Prerequisite: permission. Individual experience in selected planning agencies for supervised performance in professional planning work.
- 687 HISTORY OF GEOGRAPHIC THOUGHT** 3 credits
Prerequisite: 481/581 or permission. Critical review of major developments in geographic concepts from ancient times to present.
- 698 INDIVIDUAL READING AND RESEARCH** 1-3 credits
(May be repeated for a total of five credits) Prerequisite: permission of instructor. Intensive investigation of selected topics under guidance of faculty member.
- 699 THESIS RESEARCH** 2 credits
(May be repeated twice) Prerequisite: permission of department head. Supervised original research.

GEOLOGY

3370:

- 504 ASTROGEOLOGY** 3 credits
Prerequisites: 3450:222, 3650:292 or permission. Relations of planet earth to the solar system and universe. Analysis and implications of data from lunar and space probes.
- 510 REGIONAL GEOLOGY OF NORTH AMERICA** 3 credits
Prerequisites: 101, 102, 210 or permission; recommended: 350. Examination of physiographic provinces of North America emphasizing structure, tectonic setting, stratigraphy and processes responsible for landforms in each province. Laboratory.
- 511 GLACIAL GEOLOGY** 3 credits
Prerequisite: 210 or permission. Causes and effects of Pleistocene expansion of polar ice masses with emphasis on glacial deposits and world climatic changes.
- 521 COASTAL GEOLOGY** 3 credits
Prerequisites: 101, 324 or permission of instructor. Study of the origins and evolution of coasts and coastal deposits with particular attention paid to the interaction of waves and currents with sediment, and the development of associated sedimentary features.
- 525 ADVANCED STRATIGRAPHY** 3 credits
Prerequisites or corequisites: 360, 324 or permission. Emphasis on correlation, depositional systems, sedimentation and tectonics, seismic stratigraphy, and terrain analysis. Laboratory in the field.
- 532 OPTICAL AND X-RAY METHODS** 3 credits
Prerequisites: 230 and 231. Techniques for the study of minerals and rocks using the petrographic microscope and x-ray diffraction equipment. Laboratory.
- 533 PETROGRAPHY** 3 credits
Prerequisite: 432/532. Origin and petrogenesis of igneous, metamorphic and sedimentary rocks as determined by microscopic studies of textures and mineral assemblages in thin section. Laboratory.
- 535 PETROLEUM GEOLOGY** 3 credits
Prerequisite: 350 or permission; recommended: 324. Natural occurrences of petroleum. Characteristics, origin, entrapment and exploration methods. Laboratory.
- 536 COAL GEOLOGY** 3 credits
Prerequisites: 101, 102; recommended: 324. Origin, composition and occurrence of coal with emphasis on depositional environments, coalification processes, exploration, evaluation and exploitation. Laboratory.
- 537 ECONOMIC GEOLOGY** 3 credits
Prerequisites: 231 and 350. Study of metallic and nonmetallic mineral deposits emphasizing paragenesis and exploration. Laboratory.
- 541 FUNDAMENTALS OF GEOPHYSICS** 3 credits
Prerequisites: 3450:223 or permission and 3650:292. Fundamental concepts in solid earth geophysics, planetary physics, geodesy, and geomagnetism. Contributions of geophysics to recent major developments in geoscience.

- 546 EXPLORATION GEOPHYSICS** 3 credits
Prerequisites: 3450:223, 3650:292 or permission. Basic principles and techniques of geophysical exploration with emphasis on gravimetric, magnetic, seismic and electrical methods and application to geological problems. Laboratory.
- 550 ADVANCED STRUCTURAL GEOLOGY** 3 credits
Prerequisite: 350 or permission. Fundamental and advanced concepts of structural geology with emphasis on current and developing concepts. Laboratory.
- 563 MICROPALAEONTOLOGY** 3 credits
Prerequisite: 360 or permission. Introduction to techniques of micropaleontology evolution and paleoecology of selected microfossil groups. Laboratory.
- 570 GEOCHEMISTRY** 3 credits
Prerequisites: 101, 230, 231, 3150:132, 133, or permission. Application of chemical principles to the study of geologic processes. Laboratory.
- 574 GROUNDWATER HYDROLOGY** 3 credits
Prerequisite: 101. Origin, occurrence, regimen and utilization of groundwater. Qualitative and quantitative presentation of geological and geochemical aspects of groundwater hydrology. Laboratory.
- 590 WORKSHOP** 1-3 credits
(May be repeated) Group studies of special topics in geology. May not be used to meet undergraduate or graduate major requirements in geology. May be used for elective credit only.
- 596 GEOLOGY FIELD CAMP** 6 credits
Prerequisites: 350 and permission; recommended: 231, 324, 395. Emphasis on collection, recording and interpretation of field data; detailed structural and stratigraphic field study.
- 608 REMOTE SENSING IN GEOLOGY** 3 credits
Prerequisite: 3350: 447/547 or equivalent. Techniques for analysis and processing of remotely sensed data from conventional and satellite sensing systems. Applications to local, regional and global geologic and environmental geology problems. Laboratory.
- 610 APPLIED QUANTITATIVE GEOMORPHOLOGY** 3 credits
Prerequisite: 210. Quantification of geomorphic processes and associated landforms. Application of statistical methods and evaluation of validity of these methods. Examination of these methods in practical problems. Laboratory.
- 623 CARBONATE PETROLOGY** 3 credits
Prerequisites: 324 and 432/532 or permission of instructor. Detailed examination of selected carbonate suites with emphasis on depositional facies and diagenetic alteration. Laboratory.
- 624 SILICICLASTIC SEDIMENTOLOGY** 3 credits
Prerequisites: 324 and 433/533 or permission of instructor. Basic processes that transport and deposit sediment and the stratification associated with these processes. Furthermore, the study of depositional systems and associated facies architecture. Laboratory.
- 631 ROCKS AND MINERALS** 4 credits
Prerequisites: 101 and permission. Intensive course integrating crystallography, mineralogy and petrology for the science teacher and graduate student from disciplines other than geology. Laboratory.
- 632 IGNEOUS PETROLOGY** 3 credits
Prerequisite: 433/533. Origin and paragenesis of igneous rocks. Theory, petrochemistry and occurrences of major igneous rock types. Selected rock suites studied. Laboratory.
- 633 METAMORPHIC PETROLOGY** 3 credits
Prerequisite: 433/533. Textures, chemistry of metamorphic reactions, phase diagrams and occurrences of metamorphic rocks. Selected rock suites studied. Laboratory.
- 634 CLAY MINERALOGY** 3 credits
Prerequisite: 432/532. Classification, identification, genesis of clay minerals, clay rocks; use, exploitation. Laboratory stresses methods of identification of clay minerals, analysis, petrogenetic interpretation of clay materials in suites of samples from the rock record. Laboratory.
- 638 ORE MICROSCOPY** 3 credits
Prerequisites: 432/532, 437/537. Identification, study of ore minerals, their textures using reflected-light microscope. Discussion of diagnostic physical, optical properties of opaque minerals. Laboratory.
- 639 NUCLEAR GEOLOGY** 3 credits
(Two hour lecture, three hour laboratory) Prerequisites: minimum of seven credits in chemistry, eight credits in physics, eight credits in calculus and eight credits in geology or permission. Discusses nature of radioactive and stable isotopes, their applications in geology, radioactive minerals, radioactive background and disposal of radioactive wastes. Nuclear analytical techniques will also be discussed; lecture, laboratory and field study.
- 643 GEOSTATISTICS** 3 credits
Prerequisites: 101, 3470:461/561 or an equivalent course in statistics. Application of statistical methods to geology and geophysics including tests of hypotheses, trend surface analysis, analysis of variance, nonparametric statistics and time series analysis.
- 645 TERRESTRIAL HEAT FLOW** 3 credits
Prerequisites: 101 and 3450: 235 or permission. Techniques of measuring terrestrial heat flow, solutions of heat conduction equation, results of heat flow measurements, geophysical deductions and future of geothermal energy.
- 649 BOREHOLE GEOPHYSICS** 3 credits
Prerequisite: 446/546 or permission of instructor. Basic principles and techniques of geophysical well logging with emphasis on electrical, radioactive and sonic measures and their quantitative evaluation. Applications in oil, gas and groundwater exploration. Laboratory.
- 656 GLOBAL TECTONICS** 3 credits
Prerequisites: 350, 441/541 or permission. Theoretical study of physical forces involved in formation and deformation of earth's crust with emphasis on plate tectonics and associated diastrophic features.
- 674 ADVANCED GROUNDWATER HYDROLOGY** 3 credits
Prerequisite: 474/574. Study of water table and artesian aquifers under steady and nonsteady state conditions. Collection and evaluation of field data with regard to theory. Water well and well field design. Laboratory and field work.
- 675 GEOCHEMICAL METHODS OF PROSPECTING** 2 credits
Prerequisites: nine credits of chemistry, nine credits of mineralogy and/or petrology; recommended: 537 and 570. Application of geochemical methods of analysis and interpretation to search for ore deposits; emphasis on stability, mobility and associations of elements in geologic environments. Laboratory.
- 678 URBAN GEOLOGY** 3 credits
Prerequisites: 210, 230 or permission. Problems of urbanization related to our finite resources and creation of wastes. Geologic hazards. Case histories. Application of geologic data to urban development.
- 680 SEMINAR IN GEOLOGY** 2 credits
(May be repeated for a total of six credits) Selected topics with reference material from original sources.

- 684 SELECTED TOPICS IN GEOLOGY** 1-3 credits
(May be repeated for a total of eight credits) Prerequisite: permission. Topics not regularly offered as formal courses, generally of classic or current importance. Entails lectures, readings, discussions and/or guided laboratory work.
- 695 ADVANCED FIELD STUDIES** 1-2 credits
(May be repeated for a total of four credits) Prerequisite: permission of instructor. Field trip course emphasizing phases of geology not readily studied in Ohio. Includes pretrip preparation, field observations and data gathering, post-trip examination and/or written report. Student will bear trip expenses.
- 696 GEOLOGY COLLOQUIUM** 1 credit
Lecture on current topics in geological sciences and thesis proposals and defenses by graduate students. May be repeated. Does not satisfy degree requirements.
- 698 GRADUATE RESEARCH PROBLEMS** 1-3 credits
(May be repeated for a total of six credits) Prerequisite: permission. Directed reading and research in an aspect of geology chosen by student in consultation with an instructor.
- 699 THESIS RESEARCH** 1-6 credits
Independent and original investigation. Must be successfully completed, report written and defended before a committee.

HISTORY

3400:

- 500 WOMEN IN REVOLUTIONARY CHINA, 1800-1990** 3 credits
Prerequisites: 3400:300, 301, or 1100:330, or permission of instructor. A study of the changes in women's lives in China during the late imperial (1644-1911), and socialist (1949-1989) periods.
- 502 SPECIAL STUDIES IN HISTORY** 3 credits
Includes experimental and interdisciplinary studies, as well as those subjects that are not listed in this *General Bulletin*. See departmental office for information on particular offerings.
- 503 UNITED STATES SOCIAL-CULTURAL HISTORY TO 1877** 3 credits
Concepts and attitudes considered in their social, cultural framework. Emphasis on population growth, rural and urban life, literature, the arts, family life, slavery and impact of Civil War.
- 504 UNITED STATES SOCIAL-CULTURAL HISTORY SINCE 1877** 3 credits
Concepts and attitudes; emphasis on business; agrarianism; self-made individuals; progressivism; impact of world wars; social-economic planning; trends in literature and art; social structure and change; black Americans; women's movements.
- 505 HISTORICAL METHODS** 3 credits
Practice in historical research and writing. Required for history major, and for graduate major who has not taken equivalent course elsewhere but does not count for graduate credit requirements.
- 506 THE AMERICAN REVOLUTIONARY ERA: POLITICAL, MILITARY, AND CONSTITUTIONAL ASPECTS** 3 credits
The struggle for the rights of Englishmen and independence; the impact of war on American society and the creation of republican institutions.
- 507 UNITED STATES DIPLOMACY TO 1919** 3 credits
Establishment of basic policies, diplomacy of expansion and emergence of a world power.
- 508 UNITED STATES DIPLOMACY SINCE 1914** 3 credits
Responses of government and public to challenges of war, peace making and power politics.
- 510 HISTORICAL AGENCY ADMINISTRATION** 3 credits
Organization and administration of non-academic historical agencies (e.g. societies, museums, libraries, etc.). Some field experience in a local historical agency.
- 511 FUNCTIONS OF HISTORICAL AGENCIES** 3 credits
Prerequisite: 410/510 or permission. The functions and programs of historical agencies. Student will develop a project that involves participating in an agency function.
- 514 HISTORY OF CANADA** 3 credits
Survey of Canadian history from the age of the explorers to the present. Special emphasis will be placed on the history of French-Canadians, on economic development and on Canadian-American relations.
- 515 LATIN AMERICA: ORIGINS OF NATIONALITY** 3 credits
Pre-Columbian civilizations, discovery and conquests; colonialism, struggle for independence and formation of new societies.
- 516 LATIN AMERICA: THE 20TH CENTURY** 3 credits
Social revolution, political ideology and contemporary problems.
- 517 THE UNITED STATES, LATIN AMERICA AND IMPERIALISM** 3 credits
Inter-American relations, militarism, dependency, Marxism and recent international and ideological trends.
- 518 MEXICO** 3 credits
History of Mexico from Indian civilizations to present with emphasis on relations with United States; social and political ramifications of the 20th Century Mexican revolution.
- 519 CENTRAL AMERICA AND THE CARIBBEAN** 3 credits
Selected aspects of the histories of Central American and Caribbean countries with emphasis on populist and peasant movements, political reform, social revolution, economic and underdevelopment, and relations with the United States.
- 521 THE AMERICAN COLONIES IN THE 17TH CENTURY, 1607-1713** 3 credits
Establishment of European colonies in America with special emphasis on English settlements and evolution of the first British Empire to 1713.
- 522 THE 18TH CENTURY COLONIES AND FOUNDING OF THE UNITED STATES, 1713-1800** 3 credits
Colonial life from the Glorious Revolution to the founding of the United States. Major movements (wars, religious revivals, economic growth) and political controversies.
- 524 AGE OF JEFFERSON AND JACKSON, 1800-1850** 3 credits
The evolution of the republic in its formative stages from Jefferson through Jackson to the Compromise of 1850. Emphasis upon political, social, intellectual and Constitutional developments.
- 525 THE CIVIL WAR AND RECONSTRUCTION, 1850-1877** 4 credits
Sectionalism, slavery and the causes of the Civil War; wartime activities of the Union and Confederacy; leading personalities; problems of reconstruction and the new Union.

- 528 THE ORIGINS OF MODERN AMERICA, 1877-1917** 3 credits
United States from Reconstruction Era to World War I (1877-1920); emphasis on political responses to rise of an industrialized-urbanized society, the populist and progressive movements.
- 529 AMERICA IN WORLD WARS AND DEPRESSION, 1917-1945** 3 credits
World War I and Versailles; the 1920s, the Great Depression and the New Deal; World War II.
- 530 RECENT AMERICA: THE UNITED STATES SINCE WORLD WAR II** 3 credits
Nuclear age, cold war, foreign policy and domestic affairs to present. Social, political, constitutional, diplomatic, cultural and economic changes since 1945.
- 531 HISTORY OF AMERICAN TRANSPORTATION** 3 credits
A survey of development of major transportation forms, water, road, rail and air. Special emphasis on technological change, social and economic trends, and government support and control.
- 532 AMERICAN ECONOMY TO 1900** 3 credits
Survey of economic developments from colonial era; including agriculture, commerce, labor. Special emphasis on role of big business and evolution of monetary and fiscal policy.
- 533 AMERICAN ECONOMY SINCE 1900** 3 credits
Survey of economic developments since 1900; topics include agriculture, business and labor. Special emphasis on role of big business and evolution of monetary and fiscal policy.
- 534 AMERICAN ENVIRONMENTAL HISTORY** 3 credits
Utilization, conservation of natural resources from beginnings of American society to present; combination of economic, technological history of extensive treatment of public policy, environmental issues.
- 535 OHIO** 3 credits
Political, social, economic and intellectual history of Ohio, with special emphasis on Ohio's relationship to Old Northwest and to the nation.
- 536 THE AMERICAN CITY** 3 credits
Development of urbanization and its consequences from colonial period to present.
- 537 AMERICAN FAMILY HISTORY** 3 credits
Evolution of American family, colonial times to present, including developments in structure and roles of family members, and status of the aged. Exploration of methods for historical study of the family.
- 538 BRONZE AGE AND ARCHAIC GREECE (3000-480 BC)** 3 credits
An intensive survey of the history of Greece from the Neolithic period to the Persian Wars. Attention will be given to the nature of the source material, ancient historiography, text criticism and the like.
- 539 CLASSICAL AND HELLENISTIC GREECE (480-146 BC)** 3 credits
Prerequisite: 438/538. An intensive survey of the history of Greece from 480 B.C. to the Hellenistic Age. Attention will be given to the nature of the source material, ancient historiography, text criticism and the like.
- 540 THE ROMAN REPUBLIC** 3 credits
An intensive survey of the Roman Republic. Attention will be given to the nature of the source material, ancient historiography, text criticism and the like.
- 541 THE ROMAN EMPIRE** 3 credits
Prerequisite: 440/540. An intensive survey of the Roman Empire. Attention will be given to the nature of the source material, ancient historiography, text criticism and the like.
- 542 MEDIEVAL EUROPE, 400-1200** 3 credits
Migration of peoples, Carolingian revival, renewed invasions; social, economic and intellectual stirrings leading to "birth of Europe."
- 543 MEDIEVAL EUROPE, 1200-1500** 3 credits
Middle Ages and the middle class; economic and political change, international wars, social unrest and religious crosscurrents.
- 545 THE RENAISSANCE** 3 credits
The age of transition from the Middle Ages to modern times (1350-1600). Special emphasis on intellectual trends, the development of humanism, and the fine arts.
- 546 THE REFORMATION** 3 credits
Europe in 16th Century; its religious, cultural, political and diplomatic development, with special emphasis on Protestant, Anglican and Catholic reformations.
- 547 EUROPEAN ABSOLUTISM AND THE ENLIGHTENMENT, 1648-1789** 3 credits
Constitutional, diplomatic, cultural, intellectual and social developments of 17th Century Europe.
- 548 EUROPE IN THE FRENCH REVOLUTIONARY ERA, 1789-1815** 3 credits
Development of Revolution; Napoleon's regime and satellites.
- 551 19TH CENTURY EUROPE, 1815-1871** 3 credits
Europe in the century of change; revolution, romanticism, industrialization, democratization, first wars of the Industrial Age.
- 552 19TH CENTURY EUROPE, 1871-1914** 3 credits
Socialism, imperialism, nationalism and the great war. The *belle époque* and contemporary artistic and intellectual currents.
- 554 20TH CENTURY EUROPE, 1914-1939** 3 credits
Europe between world wars; Russian revolution, fascism and national socialism; plight of democracies.
- 555 20TH CENTURY EUROPE SINCE 1939** 3 credits
Europe in World War II, the cold war and attempts at unity.
- 558 RUSSIA TO 1801** 3 credits
Survey of Russian history from Kievan period to death of Paul I, emphasizing development of autocratic government, Russian culture, reigns of Peter and Catherine.
- 559 RUSSIA SINCE 1801** 3 credits
Survey of 19th and 20th Centuries. Special emphasis on problems of modernization, the revolution and development of communism.
- 580 WAR AND WESTERN CIVILIZATION** 3 credits
War and society in Europe, America and beyond from ancient world to present with special emphasis on period since 1740.
- 570 ENGLAND TO 1688** 3 credits
Survey of English history from the Anglo-Saxon conquest to the Revolution of 1688. Medieval and early modern institutions, social and cultural life.
- 571 ENGLAND SINCE 1688** 3 credits
Survey of English history from 1688 to the present. The reform of English institutions and life, modernization of the economy, the welfare state, society and war.
- 572 TUDOR AND STUART ENGLAND, 1485-1714** 3 credits
Emphasis on social, economic and cultural topics, including literature, art and architecture.
- 577 WESTERN SCIENCE TO 1800** 3 credits
Science in Greek, Roman, Islamic, European societies with special emphasis on the scientific revolution of the 16th and 17th Centuries.
- 578 WESTERN SCIENCE SINCE 1800** 3 credits
Continuing development of physical, medical, biological sciences in European and American societies. Atomic physics and weapons, evolution, genetics, modern medicine.
- 579 WESTERN TECHNOLOGY** 3 credits
Technology in Mesopotamia, Egypt, Greece, Rome, Islam, medieval Europe; first and second industrial revolutions in Europe, America.
- 582 IMPERIALISM IN EAST ASIA IN THE 19th AND 20th CENTURIES** 3 credits
An examination of the East Asian relations in the modern period, highlighting China's response to British, Russian, and Japanese imperialism in the 19th and 20th centuries.
- 587 MODERN INDIA** 3 credits
History of the Indian subcontinent from c.1500 with emphasis on Indian society and culture, British imperialism, and the emergence of Indian nationalism.
- 590 WORKSHOP IN HISTORY** 1-3 credits
(May be repeated) Group studies of special subjects pertaining to history. May be used for elective credit only. May not be used to meet undergraduate or graduate major requirements in history.
- 622 READING SEMINAR IN ANCIENT HISTORY** 4 credits
Study of historical literature, sources of materials and major interpretations of ancient history, especially Greek and Roman periods.
- 623 WRITING SEMINAR IN ANCIENT HISTORY** 4 credits
Prerequisite: 622. Research and writing in selected topics of ancient history, particularly Greek and Roman eras.
- 625 READING SEMINAR IN MEDIEVAL HISTORY** 4 credits
Study of historical literature, sources of materials and major interpretations of medieval European history.
- 626 WRITING SEMINAR IN MEDIEVAL HISTORY** 4 credits
Prerequisite: 625. Research and writing in selected topics of European medieval history from barbarian invasions through later Middle Ages.
- 631 READING SEMINAR IN MODERN EUROPEAN HISTORY TO 1815** 4 credits
Study of historical literature, sources of materials, major interpretations of early modern European history to Napoleonic era.
- 632 WRITING SEMINAR IN MODERN EUROPEAN HISTORY TO 1815** 4 credits
Prerequisite: 631. Research and writing in selected topics of early modern European history, occasionally including social, economic and intellectual subjects.
- 634 READING SEMINAR IN MODERN EUROPEAN HISTORY SINCE 1815** 4 credits
Study of historical literature, sources of materials and major interpretations of modern European history since early 19th Century.
- 635 WRITING SEMINAR IN MODERN EUROPEAN HISTORY SINCE 1815** 4 credits
Prerequisite: 634. Research and writing in selected topics of modern European history, occasionally including social, economic and intellectual subjects.
- 640 READING SEMINAR IN HISTORY OF SCIENCE** 4 credits
Study of historical literature, sources of materials and major interpretations in history of science.
- 641 WRITING SEMINAR IN HISTORY OF SCIENCE** 4 credits
Research and writing in selected topics in history of science.
- 651 READING SEMINAR IN THE HISTORY OF ENGLAND AND THE EMPIRE** 4 credits
Study of historical literature, sources of materials and major interpretations of English and British imperial history.
- 652 WRITING SEMINAR IN THE HISTORY OF ENGLAND AND THE EMPIRE** 4 credits
Prerequisite: 651. Research and writing in selected topics of English and British imperial history.
- 666 READING SEMINAR IN AMERICAN HISTORY TO 1865** 4 credits
Study of historical literature, sources of materials and major interpretations of American colonial and United States history to Civil War.
- 667 WRITING SEMINAR IN AMERICAN HISTORY TO 1865** 4 credits
Prerequisite: 666. Research and writing in selected topics of American history from colonial period to Civil War.
- 669 READING SEMINAR IN AMERICAN HISTORY SINCE 1865** 4 credits
Study of historical literature, sources of materials and major interpretations of United States history since Civil War.
- 670 WRITING SEMINAR IN AMERICAN HISTORY SINCE 1865** 4 credits
Prerequisite: 669. Research and writing in selected topics of United States history since Civil War.
- 677 READING SEMINAR IN LATIN AMERICAN HISTORY** 4 credits
Prerequisite: two courses in Latin American studies or permission of instructor. Study of historical literature, sources of materials and major interpretations of Latin American history.
- 678 WRITING SEMINAR IN LATIN AMERICAN HISTORY** 4 credits
Prerequisite: 677. Research and writing in selected topics in social, cultural, diplomatic, intellectual and political history of Latin America.
- 680 READING SEMINAR: CHINA** 4 credits
Study of Chinese texts, secondary literature, and major interpretations of the history of China.
- 681 WRITING SEMINAR: CHINA** 4 credits
Preparation of research paper, including a bibliographic essay surveying scholarship on the topic, research and analysis of primary sources, and writing.
- 689 HISTORIOGRAPHY** 3 credits
Study of historians, historical writings and interpretations through the ages. Required for master's degree if candidate has not had equivalent undergraduate or graduate course elsewhere.
- 690 HISTORY TEACHING PRACTICUM** 3 credits
Prerequisite: graduate assistantship. Required of all graduate assistants each fall semester. Training and experience in college teaching of history under the supervision of an experienced faculty member. Credits may not be used to meet degree requirements.

- 694 THESIS RESEARCH** 3 credits
Research for Master of Arts degree thesis.
- 897,8 INDIVIDUAL READING FOR M.A. STUDENT** 1-4 credits each
(May be repeated for a total of 12 credits) Directed reading to fit individual student programs. May be repeated, but no more than six credits may count toward the M.A. degree in history. Written permission of the instructor required.
- 699 THESIS WRITING** 3 credits
Prerequisite: 694. Writing of Master of Arts degree thesis.
- 797,8 INDIVIDUAL READING FOR Ph.D. STUDENT** 1-6 credits each
(May be repeated, but no more than 12 credits may apply toward the Ph.D. in history) Directed reading to fit individual student programs. Written permission of the instructor required.
- 898 DISSERTATION RESEARCH** 1-12 credits
Research for Doctor of Philosophy degree dissertation.
- 899 DISSERTATION WRITING** 1-12 credits
Prerequisite: 898. Writing of Doctor of Philosophy degree dissertation.

- 539 ADVANCED ENGINEERING MATHEMATICS II** 3 credits
Prerequisites: 438/538 or both 235 or 335 and 312. Complex analysis, series solutions to differential equations, special functions, Fourier series transforms, partial differential equations — applied to engineering problems. Does not satisfy elective requirements for mathematical sciences degree.
- 541 CONCEPTS IN GEOMETRY** 4 credits
Prerequisite: 222 or permission of instructor; 307 is recommended. Axiomatic treatment of both Euclidean and non-Euclidean geometries. Other concepts included are finite geometry, transformations, constructions and inversions.
- 542 PROJECTIVE GEOMETRY** 3 credits
Prerequisite: 222 or permission. Complex projective planes, duality, homogeneous coordinates, 1-1 correspondence, cross ratios, harmonic ranges, conics, quadrilaterals, quadrangles, applications to Euclidean geometry, quadric surfaces.
- 545 INTRODUCTION TO TOPOLOGY** 3 credits
Prerequisite: 307 or permission of instructor. Introduction to topological spaces and topologies, mappings, cardinality, homeomorphisms, connected spaces, metric spaces.
- 589 TOPICS IN MATHEMATICS** 1-3 credits
(May be repeated for a total of six credits) Prerequisite: permission of instructor. Selected topics in mathematics and applied mathematics at an advanced level.
- 591 WORKSHOP IN MATHEMATICS** 1-3 credits
(May be repeated) Group studies of special topics in mathematics and statistics. May not be used to meet undergraduate or graduate major requirements in mathematics and statistics. May be used for elective credit only.

MATHEMATICS

3450:

- 510 ADVANCED LINEAR ALGEBRA** 3 credits
Prerequisite: 312. Study of vector spaces, linear transformation, canonical and quadratic forms, inner product spaces.
- 511 ABSTRACT ALGEBRA I** 3 credits
Prerequisite: 307 or permission. Study of groups, rings, fields, integral domains, vector spaces, field extensions, Galois theory.
- 512 ABSTRACT ALGEBRA II** 3 credits
Prerequisite: 411/511 or permission of instructor. Study of groups, rings, fields, integral domains, vector spaces, field extensions, Galois theory.
- 513 THEORY OF NUMBERS** 3 credits
Prerequisite: 222 or permission. Euclidean algorithm, unique factorization theorem, congruences, primitive roots, indices, quadratic residues, number-theoretic functions, Gaussian integers and continued fractions.
- 514 VECTOR ANALYSIS** 3 credits
Prerequisite: 223. Vector algebra, calculus of scalar-vector, vector-scalar, vector-vector functions; integral theorems; orthogonal and general curvilinear. Application of geometry and engineering.
- 515 COMBINATORICS AND GRAPH THEORY** 3 credits
Prerequisite: 222 or permission. Introduction to basic ideas and techniques of mathematical counting; properties of structure of systems.
- 521,2 ADVANCED CALCULUS I AND II** 3 credits each
Sequential. Prerequisite: 223; 307 is highly recommended. Real number system, sequences, series, set theory, continuity, differentiation, integration, partial derivatives, multiple integration, maxima and minima, convergence and uniform convergence, power series, improper integrals, transformations, line and surface integrals.
- 525 COMPLEX VARIABLES** 3 credits
Prerequisite: 223. Complex variables; elementary functions, differentiation and analytic functions; integration and Cauchy's theorem; power series and Laurent series; residue theorem; applications such as conformal mappings, inversion of integral transform.
- 527 INTRODUCTION TO NUMERICAL ANALYSIS** 3 credits
Prerequisites: 223 and 3460:201 or 330 or knowledge of FORTRAN. Mathematical analysis of numerical methods for solving equations, interpolating function values, approximating derivatives and integrals, approximating functions.
- 528 NUMERICAL LINEAR ALGEBRA** 3 credits
Prerequisites: 223 and 3460:201 or 330 or knowledge of FORTRAN. Mathematical analysis of numerical methods for solving systems of linear equations, eigen value problems, nonlinear systems, linear least square problems.
- 529 NUMERICAL SOLUTIONS FOR ORDINARY DIFFERENTIAL EQUATIONS** 3 credits
Prerequisite: 427/527. Mathematical analysis of numerical methods for solving ordinary differential equations. Runge-Kutta and linear multistep methods for initial value problems. Shooting, collocation and difference methods for boundary value problems.
- 530 NUMERICAL SOLUTIONS FOR PARTIAL DIFFERENTIAL EQUATIONS** 3 credits
Prerequisite: 428/528 or equivalent. For advanced undergraduate and graduate students. The study of finite difference and finite element methods for partial differential equations — consistency, stability, convergence and computer implementation.
- 531 SPECIAL FUNCTIONS AND OPERATIONAL CALCULUS** 3 credits
Prerequisite: 235 or 335. Series solutions to differential equations; Bessel functions; orthogonal polynomials; self-adjoint boundary value problems and Fourier series; Laplace transforms; Fourier transforms.
- 532 PARTIAL DIFFERENTIAL EQUATIONS** 4 credits
Prerequisite: 223 and 335. The classical initial value and boundary value problems of mathematical physics developed and solved using Fourier series and integral transforms.
- 535 SYSTEMS OF ORDINARY DIFFERENTIAL EQUATIONS** 3 credits
Prerequisites: 235 or 335 and either 312 or 428 or permission. Analysis, solution of systems of equations, linear, nonlinear. Topics: stability theory, perturbation methods, asymptotic methods, applications from physical, social sciences.
- 536 MATHEMATICAL MODELS** 3 credits
Prerequisite: 235 or 335, and a six-hour sequence in an approved applied area, or permission. Formulation and analysis of mathematical models in social and physical sciences. Analysis of deterministic and stochastic models. Topics may include stochastic processes, linear programming, graph theory, theory of measurement.
- 536 ADVANCED ENGINEERING MATHEMATICS I** 3 credits
Prerequisite: 235 or 335. Linear algebra, vector analysis, Laplace transforms, systems of differential equations, related numerical methods — applied to typical engineering problems. Does not satisfy elective requirements for mathematical sciences degree.
- 601 INTRODUCTION TO ANALYSIS** 4 credits
Prerequisite: permission. An introduction to analysis to include differentiation and integration, maxima and minima, Lagrangian multipliers, transformations, infinite series, line and surface integrals, improper integrals. May not be used to meet degree requirements for mathematical sciences majors.
- 611 TOPICS IN ALGEBRA** 3 credits
Prerequisite: 512. Advanced study of selected topics in some of the following areas: semigroups, groups, rings, modules and fields.
- 621 REAL ANALYSIS** 3 credits
Prerequisite: 422/522 or permission. In-depth study of real analysis — metric spaces, normed vector spaces, integration theory, Hilbert spaces.
- 622 MEASURE THEORY** 3 credits
Prerequisite: 621. Measure, measurable function, Lebesgue-Stieltjes integra, Lp-spaces, Hahn-Jordan decompositions, Baire and Borel sets.
- 625 ANALYTIC FUNCTION THEORY** 3 credits
Prerequisite: 422/522. Complex number system, holomorphic functions, continuity, differentiability, power series complex integration, residue theory, singularities, analytic continuation, asymptotic expansion.
- 627,8 ADVANCED NUMERICAL ANALYSIS I AND II** 3 credits each
Sequential. Prerequisite: 422/522. Theoretical analysis of numerical methods in linear algebra, polynomial interpolation and approximation, integration and ordinary differential equations.
- 631 CALCULUS OF VARIATIONS** 3 credits
Prerequisite: 235 or 335. Problems with fixed and movable endpoints, problems with constraints, generalization to several variables, the maximality principle, linear time-optimal problems, the connective between classical theory and the maximality principle.
- 632 ADVANCED PARTIAL DIFFERENTIAL EQUATIONS** 3 credits
Prerequisite: 432/532 or permission. Existence, uniqueness and stability of solutions to general classes of partial differential equations. Methods for solving these classes introduced, emphasizing both analytical and numerical techniques.
- 633/634 METHODS OF APPLIED MATHEMATICS I AND II** 3 credits each
Prerequisites: 521 or 538, 539 or permission. Methods of applied mathematics concentrating on techniques for analysis of differential and integral equations — applied complex analysis, integral transforms, partial differential equations, and integral equations.
- 635 OPTIMIZATION** 3 credits
Prerequisite: 422/522 or permission. Unconstrained and constrained optimization theory and methods in applied problems.
- 636 ADVANCED COMBINATORICS AND GRAPH THEORY** 3 credits
Prerequisite: 235 or 335. Theory and techniques of combinatorics as applied to network problems and graph theoretic problems.
- 642 DIFFERENTIAL GEOMETRY** 3 credits
Prerequisite: 422/522. Analytic representation of space curves, surfaces; intrinsic geometry of surface; geometry of surfaces in large.
- 645 TOPOLOGY** 3 credits
Prerequisite: 422/522. Set theory, ordinal and cardinal numbers, topological spaces, filters and nets, separation, coverings, metric spaces, homotopy, related topics.
- 689 ADVANCED TOPICS IN MATHEMATICS** 1-3 credits
(May be repeated for a total of six credits) Prerequisite: permission of instructor. Topics within research interests of faculty members in mathematics and applied mathematics.
- 692 MATHEMATICS AND STATISTICS SEMINAR** 2 credits
(May be repeated for a total of four credits) For properly qualified candidate for master's degree in mathematics and statistics. Seminar-type discussions involving special problems dealing with mathematics and statistics. Includes a supervised research project.
- 695 PRACTICUM IN MATHEMATICS AND STATISTICS** 1-3 credits
(May be repeated) Prerequisite: graduate teaching assistant or permission. Training and experience in college teaching of mathematical sciences. May not be used to meet degree requirements. May be taken only on a credit/noncredit basis.
- 697 INDIVIDUAL READING** 1-2 credits
(May be repeated for a total of four credits) Prerequisites: graduate standing and permission. Directed studies in mathematics at graduate level under guidance of selected faculty member.
- 699 THESIS RESEARCH** 2 credits
(May be repeated for a total of four credits) Prerequisite: permission. Properly qualified candidate for master's degree may obtain four credits for research experience which culminates in presentation of faculty-supervised thesis.

COMPUTER SCIENCE**3460:**

- 518 INTRODUCTION TO DISCRETE STRUCTURES** 3 credits
Prerequisite: 210 or permission. Introduction to a number of structures in algebra of particular use to student in computer science. Topics include algorithms and flow chart language, graphs and digraphs, trees, lattices codes.
- 520 STRUCTURED PROGRAMMING** 3 credits
Prerequisite: 316 and 418. Techniques of block programming using a structured programming language, program readability, program verification and program design.
- 526 OPERATING SYSTEMS** 3 credits
Prerequisites: 307, 316 (and 330 or knowledge of C). Introduction to various types of operating systems: batch processing systems, multiprogramming systems and interacting processes: storage management; process and resource control; deadlock problem. Course is independent of any particular operating system.
- 528 UNIX SYSTEM PROGRAMMING** 3 credits
Prerequisite: 426 (and 330 or knowledge of C). An overview of the UNIX operating system. Shell programming, Process management, processor management, storage management, scheduling algorithms, resource protection, and system programming.
- 530 THEORY OF PROGRAMMING LANGUAGES** 3 credits
Prerequisite: 316 and 330. More advanced concepts underlying programming languages and their applications, formal definitions of programming languages, Backus Normal Form, semantics, compiler design.
- 535 ANALYSIS OF ALGORITHMS** 3 credits
Prerequisites: 316 and 418. Design and analysis of efficient algorithms for random access machines; derivation of pattern classification algorithms.
- 540 COMPILER DESIGN** 3 credits
Prerequisites: 307 and 316. Techniques used in writing and modifying compilers including translation, loading, execution, symbol tables and storage allocation; compilation of simple expressions and statements. Organization of a compiler for handling lexical scan, syntax scan, object code generation, error diagnostics and code optimization. Use of compiler writing languages and boot-strapping. The course requires a project involving compiler writing.
- 555 DATA COMMUNICATION AND NETWORKS** 3 credits
Prerequisites: 210 (and 330 or knowledge of C). Introduction to data communications, teleprocessing networks: codes, modes of transmission, errors, protocol.
- 557 COMPUTER GRAPHICS** 3 credits
Prerequisite: 210 (and 330 or knowledge of C). Topics in vector graphics, scan line graphics, representations and languages for graphics.
- 560 ARTIFICIAL INTELLIGENCE AND HEURISTIC PROGRAMMING** 3 credits
Prerequisite: 316 (and 330 or knowledge of LISP). Study of various programs which have displayed some intelligent behavior. Exploration of level at which computers can display intelligence.
- 565 COMPUTER ORGANIZATION** 3 credits
Prerequisite: 306. An introduction to the hardware organization of the computer at the register, processor and systems level. An in-depth study of the architecture of a particular computer systems family.
- 567 MICROPROCESSOR PROGRAMMING AND INTERFACING** 3 credits
Prerequisites: 306, 316. Detailed study of a particular microprocessor architecture and instruction set. Standard device interface components. Real time programming concepts.
- 570 AUTOMATA, COMPUTABILITY AND FORMAL LANGUAGES** 3 credits
Prerequisite: 418. Presentation of theory of formal languages and their relation to automata. Topics include description of languages; regular context-free and context-sensitive grammars; finite, pushdown and linear-bounded automata; Turing machines; closure properties; computational complexity, stack automata and decidability.
- 575 DATA-BASE MANAGEMENT** 3 credits
Prerequisites: 316 (and 330 or knowledge of C). Fundamentals of data-base organization, data manipulations and representation, data integrity, privacy.
- 589 TOPICS IN COMPUTER SCIENCE** 1-3 credits
(May be repeated for a total of six credits) Prerequisite: permission of instructor. Selected topics in computer science at an advanced level.
- 591 WORKSHOP IN COMPUTER SCIENCE** 1-3 credits
Group studies of special topics in computer science. May not be used to meet graduate or undergraduate requirements in mathematics, statistics or computer science.
- 597 INDIVIDUAL READING IN COMPUTER SCIENCE** 1-3 credits
(May be repeated) Prerequisite: permission. Computer science major only. Directed studies designed as introduction to research problems, under guidance of designated faculty member.
- 610 SYMBOLIC AND NUMERICAL METHODS** 3 credits
Prerequisite: 3450:223 (and 3450:312 or 428/528, or 410/510) and (3460:330 or knowledge of LISP). Computer applications of symbolic methods using an advanced symbol manipulation language (MACSYMA). LISP-level programming for MACSYMA. Theoretical and practical aspects of combining symbolic and numerical methods.

STATISTICS**3470:**

- 515 MATHEMATICAL CONCEPTS FOR STATISTICS** 4 credits
Prerequisites: 3450:223, 3450:312, or equivalent. Topics from matrix algebra and analysis: quadratic forms, eigenvalues and roots, generalized inverses, vector functions, continuity, differentiation, extrema problems, multivariate integration, infinite series, and application. May not be used to meet graduate degree requirements for mathematical sciences majors.
- 550 PROBABILITY** 3 credits
Prerequisite: 3450:221. Introduction to probability, random variables and probability distributions, expected value, sums of random variables, Markov processes.
- 551,2 THEORETICAL STATISTICS I AND II** 3 credits each
Sequential. Prerequisite: 3450:223. Elementary combinatorial probability theory, probability distributions, mathematical expectation, functions of random variables, sampling distributions, point and interval estimation, tests of hypotheses, regression and correlation, introduction to experimental designs.
- 560 STATISTICAL METHODS** 4 credits
Application of statistical methods to the social sciences including descriptive statistics, probability distributions, statistical inference (parametric, nonparametric), categorical data analysis, linear regression, correlation, computer applications. May not be used to meet Mathematical Sciences degree requirements.
- 561 APPLIED STATISTICS I** 4 credits
Prerequisite: 3450:222 or 216 or equivalent. Applications of statistical theory to natural and physical sciences and engineering, including probability distributions, interval estimation, hypotheses testing (parametric and nonparametric), and simple linear regression and correlation.
- 562 APPLIED STATISTICS II** 4 credits
Prerequisite: 461/561 or equivalent. Applications of the techniques of regression and multifactor analysis of variance.
- 565 DESIGN OF SAMPLE SURVEYS** 3 credits
Prerequisite: 461/561 or equivalent. Design and analysis of frequently used sample survey techniques.
- 567 RESPONSE SURFACE METHODOLOGY** 3 credits
Prerequisite: 462/562 or equivalent. First and second order response surface designs, efficient experimental plans, methods for the analysis, and optimization of response functions.
- 569 RELIABILITY MODELS** 3 credits
Prerequisite: 461/561. Selected topics in reliability modeling including parametric and nonparametric models, competing modes of failure, censored data and accelerated life models.
- 571 ACTUARIAL SCIENCE I** 3 credits
Prerequisite: 3450:216 or 222 or equivalent. Study of various statistical, financial, and mathematical calculations used to determine insurance premiums related to contingent risks based on individual risk model frameworks.
- 572 ACTUARIAL SCIENCE II** 3 credits
Prerequisite: 471/571. Continuation of Actuarial Science I. Study of multiple life functions, multiple decrement models, valuation theory for pension plans, insurance models including expenses, nonforfeiture benefits and dividends.
- 575 FOUNDATIONS OF STATISTICAL QUALITY CONTROL** 3 credits
Prerequisite: 461/561 or equivalent. Course provides a solid foundation in the theory and applications of statistical techniques widely used in industry.
- 580 STATISTICAL COMPUTER APPLICATIONS** 3 credits
Prerequisites: 3450:222 and one semester course in statistics or permission. Translation of statistical operations into computer languages, iterative procedures, generating data, Monte Carlo techniques, use of statistical packages.
- 589 TOPICS IN STATISTICS** 1-3 credits
(May be repeated for a total of six credits) Prerequisite: permission. Selected topics in advanced statistics, including quality control, reliability, sampling techniques, decision theory, advanced inference, stochastic processes and others.
- 591 WORKSHOP IN STATISTICS** 1-3 credits
(May be repeated with change of topic) Group studies of special topics in statistics. May not be used to meet undergraduate or graduate major requirements in mathematics and statistics. May be used for elective credit only.
- 595 STATISTICAL CONSULTING** 1-3 credits
Prerequisite: 480/580 or permission. Students will be assigned to work with an instructor on current projects in the Center for Statistical Consulting. May be repeated for a total of 4 credits; however, only 2 credits will count toward major requirements. Does not count for elective credit for math science department majors.
- 620 APPLICATIONS OF MATRICES TO STATISTICS** 3 credits
Prerequisite: 461/561 or equivalent. Matrices, introduction to multivariate normal distribution, applications of matrices to linear models.
- 650 ADVANCED PROBABILITY AND STOCHASTIC PROCESSES** 3 credits
Prerequisite: 651. Random walk, distributions, unlimited sequence of trials, laws of large numbers, convolutions, branching processes, renewal theory, Markov chains, time-dependent stochastic processes.
- 651 PROBABILITY AND STATISTICS** 4 credits
Prerequisites: 3450:521/522 or 515 or equivalent. Probability, random variables, moments and generating functions, random vectors, special distributions, limit theorems, sampling, point estimation, hypothesis testing, confidence estimation.
- 652 ADVANCED MATHEMATICAL STATISTICS** 3 credits
Prerequisite: 651. Convergence of random variables, the Central Limit Theorem; theory of estimation; theory of hypothesis testing; the multivariate normal density; introduction to linear models; Bayesian statistics.
- 655 LINEAR MODELS** 3 credits
Prerequisites: 3450:312 and 651 or equivalent. General linear model in matrix notation, general linear hypothesis, regression models, experimental design models, analysis of variance and covariance, variance components.
- 663 EXPERIMENTAL DESIGN** 3 credits
Prerequisites: 562 or equivalent. Selected topics in experimental design including random and fixed effects, nested designs, split plot designs, confounding, fractional factorials, latin squares, and analysis of covariance.
- 664 STATISTICS FOR THE HEALTH SCIENCES** 4 credits
(May not be used to meet degree requirements for mathematical sciences majors) Prerequisite: college-level algebra or equivalent. Descriptive statistics, probability and probability distribution, tests of hypotheses and confidence intervals, nonparametric statistics, regression and correlation.
- 665 REGRESSION AND CORRELATION** 3 credits
Prerequisites: 560 or 561 or 664 or equivalent. Analytical theory: least squares — matrix notation, methodology; multiple regression; orthogonal polynomials; correlation, partial correlation; stepwise regression; model building; response surfaces.
- 666 NONPARAMETRIC STATISTICS-METHODS** 3 credits
Prerequisites: 560 or 561 or equivalent. Theory and practice using techniques requiring less restrictive assumptions. Nonparametric analogues to t- and F-tests, ANOVA, regression and correlation. Computer applications.
- 667 FACTOR ANALYSIS** 3 credits
Prerequisite: 560 or 561 or 664. Theory and techniques for identifying variables through use of principal components and factor analysis. Identification of groups using cluster analysis. Computer applications.
- 668 MULTIVARIATE STATISTICAL METHODS** 3 credits
Prerequisite: 562 or equivalent. Multivariate techniques including distance concept, Hotelling T², multivariate ANOVA, regression and correlation, linear contrasts, factorial experiments, nested and repeat measure designs, Bonferroni X² tests, linear discrimination analysis, canonical correlation, application.

- 689 ADVANCED TOPICS IN STATISTICS** 1-3 credits
(May be repeated for a total of six credits)
Prerequisite: 651. Selected topics in statistics including concepts in order, statistics, advanced inference, sequential analysis, stochastic processes, reliability theory, Bayesian statistics and regression.
- 692 STATISTICS AND MATHEMATICS SEMINARS** 2 credits
Prerequisites: For properly qualified candidate for master's degree in Statistics and Mathematics. (May be repeated for a total of four credits.) Seminar-type discussions involving special problems dealing with statistics and mathematics. Includes a supervised research project.
- 697 INDIVIDUAL READING** 1-2 credits
(May be repeated for a total of four credits)
Prerequisites: graduate standing and permission. Directed studies in statistics under guidance of selected faculty member.
- 699 THESIS RESEARCH** 2 credits
(May be repeated for a total of 4 credits)
Prerequisite: Permission. Properly qualified candidates for master's degree may obtain 2-4 credits for research experience which culminates in presentation of faculty-supervised thesis.

MODERN LANGUAGES

3500:

- 590 WORKSHOP** 2 credits
(May be repeated) Group studies of special topics in modern languages.

FRENCH

3520:

- 502 ADVANCED FRENCH GRAMMAR** 3 credits
Advanced study of normative French grammar with emphasis on syntax, morphology, grammatical structure and phonetic principles.
- 507 FRENCH LITERATURE OF THE MIDDLE AGES AND THE RENAISSANCE** 4 credits
Prerequisite: 302 or 306 or permission. Reading and discussion of selected Medieval and Renaissance literary works. Conducted in French.
- 511 17TH CENTURY FRENCH LITERATURE** 4 credits
Prerequisite: 302 or 306 or permission. Reading and discussion of selected works in poetry, drama and novels. Conducted in French.
- 515 18TH CENTURY FRENCH LITERATURE** 4 credits
Prerequisite: 302 or 306 or permission. Reading and discussion of selected authors: emphasis on the *Philosophes*. Conducted in French.
- 519 19TH CENTURY FRENCH LITERATURE** 4 credits
Prerequisite: 302 or 306 or permission. Reading and discussion of selected works pertaining to romantic, realistic and naturalistic movements. Conducted in French.
- 527 20TH CENTURY FRENCH LITERATURE** 4 credits
Prerequisite: 302 or 306 or permission. Reading and discussion of the most representative works of period. Conducted in French.
- 529 FRANCOPHONE CARIBBEAN LITERATURE** 3 credits
Prerequisites: 302 or 306 or permission of instructor. A study of selected literary works from Haiti, Guadeloupe, and Martinique in light of their geographic, historic, socioethnic, and cultural determinants.
- 560 SELECTED THEMES IN FRENCH LITERATURE** 3 credits
(May be repeated.) Conducted in French. Prerequisite: 302 and 306 or equivalents. Reading and discussion of literary works selected according to an important theme.
- 571 FRENCH LANGUAGE READING PROFICIENCY** 4 credits
Designed to develop proficiency in reading comprehension.
- 603,4 ROMANCE AND APPLIED LINGUISTICS** 4 credits each
History of French language from 842 to present. Second semester deals with application of linguistic research to teaching of French.
- 607,8 SELECTED TOPICS IN THE MOVEMENT OF IDEAS IN FRENCH LITERATURE** 4 credits each
Study of ideas instrumental in shaping French thought and culture.
- 619,20 FRENCH CULTURE EXPRESSED IN LITERATURE** 4 credits each
Anthropological approach emphasizing social and civic institutions, education, music and arts, value systems and national characteristics.
- 641 SEMINAR: FRANCOPHONE LITERATURE, CULTURE AND CIVILIZATION** 2 credits
Study of various aspects of culture, civilization and literature of French expression outside of France.
- 642 SEMINAR: THE IMAGE OF THE WOMAN IN FRENCH LITERATURE** 2 credits
Study of the woman as characterized in French literature from Middle Ages to present.
- 661 FRENCH TEACHING PRACTICUM** 2 credits
Prerequisite: teaching assistantship or permission. Orientation and practice of particular aspects of teaching language and culture. Periodical review and evaluation. Credits may not be applied toward degree requirement.
- 697,8 INDIVIDUAL READING AND RESEARCH SEMINAR** 1-4 credits each
Prerequisite: permission. Independent study and research in specific areas. Considerable reading and writing required.
- 699 THESIS WRITING** 4 credits

GERMAN

3530:

- 519 THE AGE OF GOETHE I** 3 credits
Prerequisite: 302 or 306 or permission. Enlightenment and generation of Sturm und Drang, including works of Wieland, Lessing, Klopstock, Herder, the young Goethe and others. Conducted in German.
- 520 THE AGE OF GOETHE II** 3 credits
Prerequisites: 302, 306 or permission. Faust, selections from parts I and II. Ballads of Goethe and Schiller. Conducted in German.
- 531 200 YEARS OF GERMAN DRAMA** 3 credits
Prerequisite: 302 or 306 or permission. Representative works of major classical dramatics including Lessing, Goethe, Schiller, Kleist, Grillparzer. Conducted in German.
- 532 200 YEARS OF GERMAN DRAMA** 3 credits
Prerequisite: 302 or 306 or permission. Representative works of the major dramatists, Buchner, Heibel, Hauptmann and Wedekind. Conducted in German.
- 535 GERMAN SHORT STORY** 3 credits
Prerequisite: 302 or 306 or permission. Reading and discussion of representative works of German romanticism, including those of Tieck, Kleist, E. T. A. Hoffman, Brentano, Eichendorff. Conducted in German.
- 536 GERMAN SHORT STORY** 3 credits
Prerequisite: 302 or 306 or permission. Reading and discussion of works representative of the period, including those of Droste-Hulshoff, Stifter, Keller, Meyer, Storm. Conducted in German.
- 539 20TH CENTURY LITERATURE I** 3 credits
Prerequisite: 302 or 306 or permission. Clash of the old and the new at the turn of the century. Works of T. Mann, Hauptmann, Kaiser, Hofmannsthal, Rilke, Wedekind and others. Conducted in German.
- 540 20TH CENTURY GERMAN LITERATURE II** 3 credits
Prerequisite: 302 or 306 or permission. Impact of modernity. Reading and discussion of writings of Hesse, Kafka, Doblin, Werfel and others. Conducted in German.
- 571 GERMAN LANGUAGE READING PROFICIENCY** 4 credits
Designed to develop proficiency in reading comprehension.

SPANISH

3580:

- 505 SPANISH LINGUISTICS: PHONOLOGY** 4 credits
Prerequisite: permission. Descriptive study of Spanish phonetics and morphology, comparison of Spanish and English sounds, historical aspects, regional accents and sociolinguistic variation. Conducted in Spanish.
- 506 SPANISH LINGUISTICS: SYNTAX** 4 credits
Prerequisite: permission. Descriptive study of Spanish syntax; introduction to theories of grammar; overview of Spanish semantics and pragmatics. Conducted in Spanish.
- 509 MEDIEVAL AND RENAISSANCE SPANISH LITERATURE** 4 credits
Prerequisite: 407 or 408 or permission. Reading and discussion of representative works that mark beginnings of Spanish literature in poetry, prose and drama, with emphasis given to the major works: *Cantar de Mio Cid*, *El Libro de Buen Amor*, *La Celestina* and the ballads. Conducted in Spanish.
- 511 SPANISH LITERATURE OF THE GOLDEN AGE** 4 credits
Prerequisite: 407 or 408 or permission. Reading and discussion of representative novels and short stories with special emphasis on works of Miguel de Cervantes. Drama, poetry and essays of 16th and 17th Centuries studied. Conducted in Spanish.
- 512 CERVANTES: DON QUIJOTE** 4 credits
Prerequisite: 407 or 408 or permission of the instructor. Reading and analysis of *Don Quijote* as the first modern novel in the historical context of Renaissance and Baroque esthetics. Conducted in Spanish.
- 515 18TH AND 19TH CENTURY SPANISH DRAMA AND POETRY** 4 credits
Prerequisite: 407 or 408 or permission. Reading, discussion and lectures. Study of Neoclassicismo and Romanticismo. Conducted in Spanish.
- 516 19TH CENTURY SPANISH PROSE** 4 credits
Prerequisite: 407 or 408 or permission. Reading, discussion and lectures. Study of Realismo, Naturalismo and *La Generacion del 98*. Conducted in Spanish.
- 518 20TH CENTURY SPANISH PROSE** 4 credits
Prerequisite: 407 or 408 or permission of the instructor. Reading and analysis of representative writers of prose fiction with a selection of works that illustrates major developments and themes. Conducted in Spanish.
- 519 20TH CENTURY SPANISH DRAMA/POETRY** 4 credits
Prerequisite: 305 or permission of the instructor. Reading and analysis of representative works of drama and poetry with a selection of works that illustrates the major developments and themes in both genres. Conducted in Spanish.
- 522 SPECIAL TOPICS IN HISPANIC CULTURE** 1-4 credits
(May be repeated) Reading and discussion of significant works in literature or culture in Spain and Latin America not studied in other courses.
- 523 SPANISH-AMERICAN LITERATURE BEFORE 1900** 4 credits
Prerequisite: 407 or 408 or permission. Reading of representative Spanish-American literature from the discovery to 1900. Oral and written reports. Conducted in Spanish.
- 524 20TH CENTURY SPANISH-AMERICAN LITERATURE** 4 credits
Prerequisite: 407 or 408 or permission. Reading and analysis of selected dramas, essays, poems and short fiction written by outstanding Spanish-American authors of this century. Conducted in Spanish.
- 525 20TH CENTURY SPANISH-AMERICAN NOVEL** 4 credits
Prerequisite: 305 or permission. Reading and discussion of representative contemporary Latin American novels. Conducted in Spanish.
- 527,8 SPANISH AND SPANISH-AMERICAN CULTURE AND CIVILIZATION** 4 credits each
Prerequisite: 302 or permission. Emphasis on customs, traditions, literary trends and artistic tendencies that constitute Spain's specific contribution to Western civilization. Study of Spanish-speaking world. Conducted in Spanish.

- 529 CULTURE AND LITERATURE OF THE HISPANIC CARIBBEAN** 4 credits
Prerequisite: 302 or permission. Emphasis on customs, traditions and literature, including lectures, films, slides, and analysis of selected writings by contemporary Hispanic authors from the Caribbean. Conducted in Spanish.
- 530 WOMEN IN 20TH CENTURY HISPANIC LITERATURE** 4 credits
Prerequisite: 407 or 408 or permission. Reading and analysis of selected works from the 20th Century that depict women in Hispanic countries. Methodologies of feminist criticism will be studied. Conducted in Spanish.
- 571 SPANISH LANGUAGE READING PROFICIENCY** 4 credits
Designed to develop proficiency in reading comprehension.
- 601 SEMINAR ON MEDIEVAL SPANISH LITERATURE** 4 credits
Reading and discussion on monumental medieval literary works of Spain such as Poema de Mio Cid, El Conde Lucanor, El Libro de Buen Amor. Conducted in Spanish.
- 609,10 SEMINAR ON SPANISH LITERATURE OF THE GOLDEN AGE: SEMINAR ON 16TH AND 19TH CENTURIES SPANISH LITERATURE** 4 credits each
Reading and discussion of representative writers from Renaissance to late Baroque period. Studies in essay, novel, theatre, poetry and philosophic writings. Conducted in Spanish.
- 613 SEMINAR ON SPANISH-AMERICAN LITERATURE** 4 credits
Studies in representative writers preceding the "Boom." Reading and discussion of various genres and authors representing significant literary developments. Conducted in Spanish.
- 617 SEMINAR ON 20TH CENTURY SPANISH-AMERICAN LITERATURE** 4 credits
Reading and discussion of contemporary writers with emphasis on theatre, novel and short story. Conducted in Spanish.
- 621 SEMINAR ON 20TH CENTURY SPANISH LITERATURE** 4 credits
Studies in representative present-day writers with analyses and discussions of novel, theatre, poetry and short stories. Conducted in Spanish.
- 661 SPANISH TEACHING PRACTICUM** 2 credits
Prerequisite: teaching, assistantship or permission. Orientation and practice of particular aspects of teaching Spanish language and culture. Student teaching experiences are periodically reviewed and evaluated. These credits may not be applied toward degree requirements.
- 697,8 INDIVIDUAL READINGS IN SPANISH** 1-4 credits each
Content of given individual reading program taken from course contents approved for graduate work in Spanish.
- 699 THESIS WRITING** 4 credits

PHILOSOPHY

3600:

- 511 LATER DIALOGUES OF PLATO** 3 credits
Prerequisites: one introductory course and 211 or permission of instructor. Readings of dialogues in translation, commencing with Theaetetus including: Parmenides, Sophist, Statesman, Philebus.
- 516 ANALYTIC PHILOSOPHY** 3 credits
Prerequisites: 211, 312 and 313 or permission of instructor. Study of ideal and ordinary language movements in 20th Century British and American philosophy. Deals with such figures as Russell, Carnap, Ayer, Moore, Wittgenstein, Ryle and Austin.
- 519 BRITISH EMPIRICISM** 3 credits
Prerequisites: one introductory course and 313 or permission of instructor. Intensive analysis of selected major writings of Locke, Berkeley and Hume.
- 521 PHILOSOPHY OF LAW** 3 credits
Prerequisite: one course in philosophy or permission of instructor. Philosophical inquiry into the nature of law and legal institutions.
- 522 CONTINENTAL RATIONALISM** 3 credits
Prerequisites: one introductory course and 313 or permission of instructor. Intensive analysis of selected major writings of Descartes, Spinoza and Leibnitz.
- 524 EXISTENTIALISM** 3 credits
Prerequisites: one introductory course in philosophy, 314 or permission of instructor. In-depth inquiry into the thought of Kierkegaard, Jaspers, Heidegger, Sartre, Tillich and other existentialists with their concern for the human condition.
- 526 PHENOMENOLOGY** 3 credits
Prerequisites: one introductory course, 314 or permission of instructor. Inquiry into methodology of Husserl and Heidegger and their influence upon Western European and American thought.
- 532 ARISTOTLE** 3 credits
Prerequisites: 211, 312 and 313 or permission of instructor. Detailed study of Aristotle's metaphysics, philosophy of nature, philosophy of mankind and ethics. Taught in alternate years.
- 534 KANT** 3 credits
Prerequisite: 313 or permission of instructor. Study of Kantian system of thought and its relation to history of philosophy. Includes thorough investigation of one or more of Kant's philosophic works.
- 544 PROBLEMS IN PHILOSOPHY** 3 credits
Prerequisites: two courses in philosophy or permission of instructor. Thorough, critical examination of one major philosophical problem.
- 562 THEORY OF KNOWLEDGE** 3 credits
Prerequisites: three courses in philosophy. Examination of nature of knowledge; theories of perception, conception and truth, problem of induction and relation of language to knowledge.
- 564 PHILOSOPHY OF SCIENCE** 3 credits
Prerequisites: 101, 170 or permission of instructor. Nature of scientific inquiry, types of explanation, laws and causality, theoretical concepts and reality. Also considers critics of hypothetical-deductive view of science, e.g., Hanson and Kuhn.
- 571 METAPHYSICS** 3 credits
Prerequisites: 211, 312 and 313 or permission of instructor. Theories about ultimate nature and ultimate explanation of reality. Uses readings from classical and contemporary sources.
- 580 SEMINAR** 3 credits
(May be repeated) Prerequisite: permission of instructor.
- 581 PHILOSOPHY OF LANGUAGE** 3 credits
Prerequisites: 101 and 170 or permission of instructor. Contemporary philosophies about nature of language and its relation to reality and human thinking. Includes discussion of views of linguists such as Chomsky.

- 597 INDIVIDUAL STUDY** 1-3 credits
(May be repeated for a total of six credits) Prerequisites: completion of required courses of philosophy major or permission of instructor and department head. Directed independent study of philosopher, philosophy or philosophical problem under guidance of selected faculty member. Subject matter determined by selected faculty member in consultation with student. Graduate credit requires significant additional work which may include additional research paper.
- 615 SEMINAR: HISTORY OF PHILOSOPHY** 3 credits
(May be repeated for a total of 12 credits) Prerequisite: permission of instructor. Study in philosophical works of one major philosopher.
- 628 ETHICAL THEORY** 3 credits
Examination of problems related to conduct and decision making in light of the Western tradition as well as contemporary insights of positivism, phenomenology, existentialism, logical analysis, naturalism and pragmatism.
- 676 LOGICAL THEORY** 3 credits
Advanced topics in logic such as modal logics and axiomatics. Recommended for law student, as logic of normative systems is treated. It is suggested that a graduate student be familiar with material covered in a course like 374 before taking this course.
- 680 SEMINAR** 3 credits
(May be repeated for a total of nine credits)
- 699 SEMINAR: THESIS SUPERVISION** 2 credits
(May be repeated)

PHYSICS

3650:

- 500 HISTORY OF PHYSICS** 3 credits
Prerequisite: 262 or 292. Study of origin and evolution of major principles and concepts characterizing contemporary physics.
- 506 WAVES** 3 credits
Prerequisite: 262 or 292. Analysis of phenomena common to all waves, including free oscillations, forced oscillations, traveling waves, reflection, polarization, interference and diffraction. Water, sound, electromagnetic, seismic and deBroglie waves examined.
- 531 MECHANICS I** 3 credits
Prerequisites: 292 and 3450:235. Mechanics at intermediate level. Newtonian mechanics, motion of a particle in one dimension, central field problem, system of particles, conservation laws, rigid bodies, gravitation.
- 532 MECHANICS II** 3 credits
Prerequisite: 431/531. Advanced mechanics at the senior or beginning graduate level, moving coordinate systems, mechanics of continuous media, Lagrange's equations, tensor algebra and stress analysis, rotation or rigid bodies, vibration theory.
- 536 ELECTROMAGNETISM I** 3 credits
Prerequisites: 292, 3450:235 or permission of instructor. Electricity and magnetism at intermediate level. Electrostatics and magnetostatics, electric field, scalar potential, dielectrics, Laplace's and Poisson's equations, currents, magnetic field, vector potential, magnetic materials, inductance.
- 537 ELECTROMAGNETISM II** 3 credits
Prerequisite: 436/536. Special relativity, four vectors, Maxwell's equations in covariant form; propagation, reflection and refraction of electromagnetic waves; multipole radiation.
- 538 METHODS OF APPLIED PHYSICS** 3 credits
Topics: design, performance, interpretation, reporting of physical measurements: the scientific method, measurements, their uncertainties, principles of experimentation, measurement devices, data resolution and analysis, inference.
- 541 QUANTUM PHYSICS I** 3 credits
Prerequisites: 301 and 3450:235. Laboratory course stressing measurement techniques with contemporary laboratory apparatus. Experiment design, instrument calibration and reporting emphasized. Modern physics experiments and measurements of fundamental natural constants.
- 542 QUANTUM PHYSICS II** 3 credits
Prerequisite: 441/541. Applications of quantum mechanics to atomic, nuclear and solid state physics. Tunneling and alpha decay, periodic potential, Hydrogen and Helium atoms, interatomic forces, quantum statistics.
- 551,2 ADVANCED LABORATORY I AND II** 2 credits each
Prerequisite: 323 or permission of instructor. Applications of electronic, solid-state devices, techniques to research-type projects in contemporary physics. Introduction to resonance techniques; nuclear magnetic resonance, electron spin resonance, nuclear quadrupole resonance. Scintillation spectroscopy. Alpha- and beta-ray spectroscopy.
- 566 DIGITAL DATA ACQUISITION** 3 credits
Prerequisite: 262 or 292. Designed to introduce science and mathematics students to use of digital techniques of interfacing instruments to microcomputers. Physical measurements and device control are emphasized.
- 570 INTRODUCTION TO SOLID-STATE PHYSICS** 3 credits
Prerequisite: 441 or permission of instructor. Account of basic physical processes occurring in solids, with emphasis on fundamental relation between these processes and periodicity of crystalline lattice.
- 571,2 NMR SPECTROSCOPY I AND II** 2 credits each
Prerequisite: 292 or permission of instructor. Theoretical basis and experimental techniques of NMR spectroscopy. Classical concepts and quantum mechanical treatments of NMR. Bloch equations; spin-spin and spin-lattice relaxation times. Steady state and transient phenomena. General features of broadband and high-resolution NMR spectra. NMR instrumentation and operating principles. Theory and analysis of high-resolution NMR spectra. Quantitative applications of broadband and high-resolution NMR spectra and determination of physical and chemical structures.
- 581,2 METHODS OF MATHEMATICAL PHYSICS I AND II** 3 credits each
Prerequisites: 292, 3450:235 and senior or graduate standing in a physical science or engineering. Vectors, generalized coordinates, tensors, calculus of variations, vector spaces, linear transformations, matrices, eigenvalues, Hilbert space, boundary value problems, transcendental functions, complex variables, analytic functions, Green's functions, integral equations.
- 587 LABORATORY PROJECTS** 1-3 credits
(May be repeated) Prerequisite: permission. Design of laboratory apparatus experiments, techniques or demonstrations.

- 588 SELECTED TOPICS: PHYSICS** 1-4 credits
(May be repeated) Prerequisite: permission. Consideration of selected topics, procedures, techniques, materials or apparatus of current interest in physics.
- 590 WORKSHOP** 1-4 credits
(May be repeated) Group studies of special topics in physics. May not be used to meet undergraduate or graduate major requirements in physics. May be used for elective credit only.
- 597 INDEPENDENT STUDY** 1-4 credits
(May be repeated) Prerequisite: permission. Further investigations of various selected topics in physics, under guidance of faculty member.
- 605 COMPUTER PHYSICS: NUMERICAL SOLUTIONS TO PHYSICS PROBLEMS I** 3 credits
Prerequisite: permission. Review of FORTRAN and basic topics in computer science. Numerical solutions to physics problems, including Newton's and Schrodinger's equations. Treatment and reduction of experimental data, plotting, simulation.
- 606 COMPUTER PHYSICS: NUMERICAL SOLUTIONS TO PHYSICS PROBLEMS II** 3 credits
Prerequisite: 605 or permission. Data reduction, Calcomp plotting, comparison of theoretical models with data, linear and non-linear least squares curve-fitting. May accommodate scientific problems of individual interest.
- 615 ELECTROMAGNETIC THEORY I** 3 credits
Prerequisite: 437/537 or permission of instructor. Electrostatics and magnetostatics at advanced level for graduate students, boundary value problems, dielectrics, multipole expansions, time-varying fields, Maxwell's equations and electromagnetic waves, reflection, refraction, wave guides and cavities.
- 616 ELECTROMAGNETIC THEORY II** 3 credits
Prerequisite: 615. Scattering and diffraction, plasma physics, special theory of relativity, dynamics of relativistic particles in fields, collisions of charged particles, radiation from moving charges, bremsstrahlung, multipole fields.
- 625 QUANTUM MECHANICS I** 3 credits
Prerequisites: 441/541, 481/581 or permission of instructor. Basic concepts of quantum mechanics, representation theory, particle in a central field, addition of angular momenta and spins, Clebsch-Gordon coefficients, perturbation theory, scattering, transition probabilities.
- 626 QUANTUM MECHANICS II** 3 credits
Prerequisite: 625. Foundations of relativistic quantum mechanics, Klein-Gordon and Dirac equations, spin-zero particle and spin-1/2 particles in electromagnetic field, second quantization of bosons and fermions, superfluidity and superconductivity.
- 631 PHYSICS OF POLYMERS I** 2 credits
Prerequisite: 3450/235 or permission of instructor. Polymeric states of matter, crystallinity, rubber elasticity, viscoelasticity, transport and electrical properties, glassy state, fracture processes. Elasticity at large strains, phenomenological viscoelasticity, dielectric properties, diffusion. Introduction to NMR spectroscopy of polymers.
- 632 PHYSICS OF POLYMERS II** 2 credits
Prerequisite: 631 or permission. Phase transitions, temperature dependence of mechanical and electrical properties, crystalline polymers, kinetics of crystallization, fracture, adhesion, wear. Applications of NMR spectroscopy to polymers.
- 635,6 PHYSICS OF POLYMERS LABORATORY I AND II** 2 credits each
Prerequisite: 291; corequisites: 631, 632. Selected laboratory experiments illustrating principles and methods discussed in 631, 632.
- 641 LAGRANGIAN MECHANICS** 3 credits
Prerequisite: 432/532 or permission of instructor. Principle of least action and Lagrangian equation of motion, conservation laws, integration or equation of motion, collisions, small oscillations, Hamilton's equations, canonical transformations.
- 661 STATISTICAL MECHANICS** 3 credits
Prerequisite: 442/542 or permission of instructor. Fundamental principles of statistical mechanics, Gibbs, Fermi and Bose Statistics, solids, liquids, gases, phase equilibrium, chemical reactions.
- 684 ADVANCED NUCLEAR PHYSICS** 3 credits
Prerequisite: 626. Quantum mechanics applied to nucleus. Interaction of radiation with nucleus, nuclear scattering, nuclear reactions; energy levels of nuclei.
- 665 SOLID-STATE PHYSICS I** 3 credits
Prerequisites: 470, 625 or permission of instructor. Theory of physics of crystalline solids. Properties of reciprocal lattice and Bloch's theorem. Lattice dynamics and specific heat. Electron states; cellular method, tight-binding method, Green's function method.
- 666 SOLID-STATE PHYSICS II** 3 credits
Prerequisite: 685. Orthogonalized plane and pseudo potentials. Electron-electron interaction; screening by impurities. Friedel sum rule and plasma oscillations. Dynamics of electrons, transport properties and Fermi surface.
- 689 SPECIAL PROBLEMS IN THEORETICAL PHYSICS** 1-4 credits
(May be repeated) Prerequisite: permission. Intended to facilitate expansion of particular areas of interest in theoretical physics, by consultation with faculty member and independent study beyond available course work.
- 690 SPECIAL PROBLEMS IN EXPERIMENTAL PHYSICS** 1-4 credits
(May be repeated) Prerequisite: permission. Intended to encourage development of experimental techniques in selected areas, under faculty supervision.
- 691 SEMINAR IN THEORETICAL PHYSICS** 1-3 credits
(May be repeated) Prerequisite: permission.
- 692 SEMINAR IN NMR SPECTROSCOPY** 1-3 credits
(May be repeated) Prerequisite: permission.
- 693 SEMINAR IN SOLID-STATE PHYSICS** 1-3 credits
(May be repeated) Prerequisite: permission.
- 697 GRADUATE RESEARCH** 1-5 credits
Prerequisite: permission. Candidates for M.S. degree may obtain up to five credits for faculty supervised research projects. Grades and credit received at completion of such projects.
- 698 SPECIAL TOPICS: PHYSICS** 1-4 credits
Prerequisite: permission. Enables student who needs information in special areas, in which no formal course is offered, to acquire knowledge in these areas.
- 699 MASTER'S THESIS RESEARCH** 1 credit
Prerequisite: permission. With approval of department, one credit may be earned by candidate for M.S. degree upon satisfactory completion of a master's thesis.
- 502 POLITICS AND THE MEDIA** 3 credits
Examination of relationships between the press, the news media and political decision makers.
- 505 POLITICS IN THE MIDDLE EAST** 3 credits
The rise of the state system in the Middle East after World War I; an analysis of the socio-cultural, ideological forces influencing the political behavior of the people of the Middle East. In-depth study of selected political systems.
- 510 INTERNATIONAL DEFENSE POLICY** 3 credits
Prerequisite: At least one of the following: 220, 310; 3400:340, 360, 407, 408, or permission. Introduction to political uses of military forces. Major focus on methodological, conceptual, and ethical dilemmas confronted in developing and implementing defense policy.
- 511 THEORIES OF INTERNATIONAL POLITICAL ECONOMY** 3 credits
Prerequisite: 310 or permission of instructor. This course examines the predominant and competing theories of international political economy, including imperialism, world systems analysis, long-wave theory, neo-mercantilism, and neo-realism.
- 512 GLOBAL ENVIRONMENT POLITICS** 3 credits
Prerequisites: 300, 310 or permission of instructor. Examines the general dimensions of the global environmental challenge, including the roles played by technology and the structure of the world system.
- 515 COMPARATIVE FOREIGN POLICY** 3 credits
Prerequisite: 310 or 220 or permission. Study of foreign policies of selected nations, with special attention to processes and instruments of decision making of the major powers.
- 520 ISSUES AND APPROACHES IN COMPARATIVE POLITICS** 3 credits
Prerequisite: 300 or permission of instructor. Detailed examination of approaches to the study of comparative politics, political parties, elites and various theories of revolution.
- 525 LATIN AMERICAN POLITICS** 3 credits
Prerequisite: 300 or permission of instructor. Examination of patterns of government and politics in Latin American area.
- 540 PUBLIC OPINION AND POLITICAL BEHAVIOR** 4 credits
Prerequisite: 100 or 120 or permission. Nature and role of public opinion in political process; historical development, current methods of measurement. Political behavior of American electorate.
- 541 THE POLICY PROCESS** 3 credits
Prerequisites: eight credits in political science. Intensive study of policy-making process, emphasizing roles of various participants in executive and legislative branches as well as private individuals and groups.
- 542 METHODS OF POLICY ANALYSIS** 3 credits
Prerequisite: 201. Examines variety of methods available for analyzing public policies. Techniques of cost benefit analysis, evaluation research quasi-experimentation are covered as well as consideration of ethical questions in policy analysis, the practical problems facing policy analysts.
- 561 THE SUPREME COURT AND CONSTITUTIONAL LAW** 3 credits
Prerequisite: 100 or permission. Interpretation of the Constitution by the Supreme Court with emphasis on federal judicial, legislative and executive power; separation of powers; and federalism.
- 562 THE SUPREME COURT AND CIVIL LIBERTIES** 3 credits
Prerequisite: 100 or permission. Interpretation of the Constitution by the Supreme Court with emphasis on freedom of speech and press, freedom of religion, criminal rights and right to privacy.
- 570 CAMPAIGN MANAGEMENT** 3 credits
Prerequisite: Six credits of political science or permission. Reading, research and practice in campaign management decision making.
- 571 CAMPAIGN FINANCE** 3 credits
Prerequisite: Six credits of political science or permission. Reading and research in financial decision making in political campaigns.
- 572 AMERICAN INTEREST GROUPS** 3 credits
Prerequisite: six credits of political science or permission. Reading and research on the development, structure and function of interest groups in the United States.
- 573 AMERICAN POLITICAL PARTIES** 3 credits
Prerequisites: six credits of political science or permission. Reading and research on the development, structure and function of parties in the United States.
- 580 POLICY PROBLEMS** 3 credits
(May be repeated for a total of six credits) Prerequisite: 380 or permission. Intensive study of selected problems in public policy.
- 590 WORKSHOP** 1-3 credits
(May be repeated) Group studies of special topics in political science. May not be used to meet undergraduate or graduate requirements in political science. Elective credit only.
- 600 SCOPE AND THEORIES OF POLITICAL SCIENCE** 3 credits
Prerequisites: six credits of political science or permission of instructor. Emphasis on the nature, scope and content of political theory; theory construction and validation in political science.
- 601 RESEARCH METHODS IN POLITICAL SCIENCE** 3 credits
Prerequisites: six credits of political science, including 440 (or a satisfactory equivalent) or permission of instructor. Techniques of quantitative research methodology in political science; utility and limitations of quantitative analysis.
- 610 SEMINAR IN INTERNATIONAL POLITICS** 3 credits
Prerequisites: six credits of political science or permission. Analysis of current problems in theory and practice of politics and organization.
- 620 SEMINAR IN COMPARATIVE POLITICS** 3 credits
Prerequisites: six credits of political science or permission. Research on selected topics in comparative politics. Comparative method.
- 626 SEMINAR IN POLITICS OF DEVELOPING NATIONS** 3 credits
Prerequisites: six credits of political science or permission. Selected topics investigated. Emphasis on theories of political development.
- 630 SEMINAR IN NATIONAL POLITICS** 3 credits
Prerequisites: six credits of political science or permission. Reading and research on formulation, development and implementation of national policy in one or more areas of contemporary significance.

- 641 SEMINAR IN INTERGOVERNMENTAL RELATIONS** 3 credits
Prerequisites: six credits of political science or permission. Graduate-level examination of problems resulting from changing relations between levels of government in the United States; comparisons with other federal systems.
- 660 SEMINAR IN CIVIL LIBERTIES AND THE JUDICIAL PROCESS** 3 credits
Prerequisites: six credits of political science or permission. Civil liberties and judicial process viewed in political context. Readings and research on selected topics.
- 668 SEMINAR IN PUBLIC POLICY AGENDAS AND DECISIONS** 3 credits
Prerequisites: six credits of political science or permission. Reading and research on the development of public policy issues and modes of decision making used by policy makers.
- 670 SEMINAR IN THE ADMINISTRATIVE PROCESS** 3 credits
Prerequisites: six credits of political science or permission. Intensive examination of administrative implementation of public policies. Readings and research on selected topics.
- 680 SEMINAR IN URBAN AND REGIONAL POLITICS** 3 credits
Prerequisites: six credits of political science or permission. Focus on processes of policy formulation and execution in modern metropolitan community, with emphasis on structural functional context.
- 690 SPECIAL TOPICS IN POLITICAL SCIENCE** 1-3 credits
Prerequisites: six credits of political science or permission. Graduate-level examination of selected topics in American politics, comparative politics, international politics or political theory.
- 695 INTERNSHIP IN GOVERNMENT AND POLITICS** 3-6 credits
(May be repeated for a total of six credits.) Prerequisite: Permission of graduate adviser. Supervised individual placement with political office holders, party groups, governmental agencies, law firms and other organizations providing professional-level work.
- 697 INDEPENDENT RESEARCH AND READINGS** 1-4 credits
(May be repeated, but no more than six credits toward the master's degree in political science) Prerequisite: permission.
- 698 POLITICAL SCIENCE PRACTICUM** 2 credits
Prerequisite: permission of instructor. Professional seminar required of new graduate students. May not be applied toward degree requirements. Covers disciplinary subfields, teaching, research practices, career tracks and program selections. Graded credit/non-credit.
- 699 THESIS** 2-6 credits

PSYCHOLOGY

3750:

- 500 PERSONALITY** 4 credits
Prerequisites: 100, 335 or instructor's permission. Consideration of current conceptualizations of the normal personality with emphasis on methods of measurement, experimental findings and research techniques.
- 510 PSYCHOLOGICAL TESTS AND MEASUREMENTS** 4 credits
Prerequisites: 100, 110 or permission. Consideration of nature, construction and use of tests and measurements in industry, government and education. Includes aptitude and achievement tests, rating scales, attitude and opinion analysis.
- 520 ABNORMAL PSYCHOLOGY** 4 credits
Prerequisites: 100 and four credits of psychology or instructor's permission. Survey of syndromes, etiology, diagnosis and treatment of major psychological conditions ranging from transient maladjustments to psychoses.
- 530 PSYCHOLOGICAL DISORDERS OF CHILDREN** 4 credits
Prerequisites: 100 and 230 or permission. Survey of syndromes, etiologies and treatments of behavioral disorders in children from standpoint of developmental psychology. Behavioral data and treatment approaches emphasized.
- 543 HUMAN RESOURCE MANAGEMENT** 4 credits
Prerequisites: 240 and a statistics course or instructor's permission. The application of psychological theory to the effective management of human resources in an organization, including recruitment, selection, training and retention of personnel.
- 544 ORGANIZATIONAL THEORY** 4 credits
Prerequisites: 240 or instructor's permission. The application of psychological theory to macro-level processes in organizations including leadership, motivation, task performance, organizational theories and development.
- 545 PSYCHOLOGY OF SMALL GROUP BEHAVIOR** 4 credits
Prerequisites: 100 and four credits of psychology or instructor's permission. Intensive investigation of factors affecting behavior and performance in small groups including effects of personality, social structures, task, situational and social-cognitive variables.
- 550 COGNITIVE DEVELOPMENT** 4 credits
Prerequisite: 345 or instructor's permission. Theory and research on life-span changes in cognitive processes including concept formation/categorization, information processing and Piagetian assessment tasks.
- 560 HISTORY OF PSYCHOLOGY** 3 credits
Prerequisite: 100 and four credits of psychology or instructor's permission. Psychology in pre-scientific period and details of development of systematic viewpoints in 19th and 20th Centuries.
- 590 WORKSHOP IN PSYCHOLOGY** 1-3 credits
(May be repeated) Group studies of special topics in psychology. May not be used to meet undergraduate or graduate major requirements in psychology.
- 601 PSYCHOLOGICAL RESEARCH USING QUANTITATIVE AND COMPUTER METHODS I AND II** 4 credits each
Prerequisite: Graduate standing in psychology or the joint doctoral program in counseling psychology or special nondegree students with permission. Psychological research problems applying quantitative and computer methods. Topics include research design, sampling, controls, threats to validity, hypotheses testing, psychological measurement, error, robustness and power.
- 610 PSYCHOLOGY CORE I: ORGANIZATIONAL, SOCIAL AND APPLIED** 4 credits
Prerequisite: graduate standing in psychology or the joint doctoral program in counseling psychology or permission based on a psychology undergraduate major or an appropriate background for the course as determined by the instructor. Survey of the social bases of behavior, group process, systems theory and motivation; application of industrial/organizational psychology to industry, business and government including organizational theory, differential psychology, personnel selection and training, consumer behavior and engineering psychology; research methodology, applied psychometrics, professional and ethical issues. Topics are considered within an historical perspective.

- 620 PSYCHOLOGY CORE II: DEVELOPMENTAL, PERCEPTUAL AND COGNITIVE** 4 credits
Prerequisite: graduate standing in psychology or the joint doctoral program in counseling psychology or permission based on a psychology undergraduate major or an appropriate background for the course as determined by the instructor. Survey of theoretical, methodological, and empirical aspects of human development, perception, learning and memory, cognition and information processing including an historical perspective.
- 630 PSYCHOLOGY CORE III: COUNSELING, INDIVIDUAL AND ABNORMAL** 4 credits
Prerequisite: graduate standing in psychology or the joint doctoral program in counseling psychology or permission based on a psychology undergraduate major or an appropriate background for the course as determined by the instructor. Survey of techniques of an approach to the study, evaluation and modification of normal and abnormal behavior. Includes study of individual differences, personality theories, adaptive and maladaptive behaviors, counseling theories, research methods and professional issues within an historical perspective.
- 640 PSYCHOLOGY CORE IV: SENSORY, BIOPSYCHOLOGICAL AND EXPERIMENTAL** 4 credits
Prerequisite: graduate standing in psychology or the joint doctoral program in counseling psychology or permission based on a psychology undergraduate major or an appropriate background for the course as determined by the instructor. Survey of the biological foundations of behavior including sensory processes, psychophysics and scaling, perception (from a comparative and evolutionary perspective), animal learning and the evolution of intelligence, behavior genetics, neuroanatomy and neurophysiology, psychopharmacology, and the physiological bases of psychological processes such as emotion, motivation, learning, laterality differences, intelligence and consciousness. Topics are considered within an historical perspective.
- 653 GROUP COUNSELING** 4 credits
Prerequisites: 671, 710; or 5600:643, 645; or permission of instructor. Emphasis is placed on providing the student with the knowledge and understanding of theory, research and techniques necessary for conducting group counseling sessions.
- 671 PRE-PRACTICUM IN COUNSELING PSYCHOLOGY** 3 credits
Prerequisites: 630, graduate standing in psychology and permission of instructor. Introduction to and training in skills used in process of counseling and psychotherapy. This course is a preparation for actual client contact in subsequent practica.
- 672 COUNSELING PRACTICUM** 4 credits
Prerequisites: 630, 671, graduate standing in psychology and permission of instructor. Extension and development of therapeutic skills and intervention techniques, with supervised training in counseling clients in the psychology department Counseling Clinic.
- 673 COUNSELING PRACTICUM II** 4 credits
Prerequisites: 630, 671, 672, graduate standing in psychology and instructor's permission. Supervised experience with clients in the psychology department Counseling Clinic. Training covers counseling, assessment and case management skills.
- 674 PERSONNEL PRACTICUM** 1-4 credits
(May be repeated) Prerequisites: 610, graduate standing in psychology, 14 credits of graduate psychology and departmental permission. Supervised field experience in industrial/organizational psychology in settings including business, government or social organizations. The field experience requires the application of industrial/organizational psychological theories and techniques.
- 675 DEVELOPMENTAL PRACTICUM** 1-4 credits
(May be repeated) Prerequisites: 610, graduate standing in psychology, 14 credits of graduate psychology and departmental permission. Supervised field experience and developmental psychology to provide the student with the opportunity to apply skills and knowledge acquired in the academic setting and to obtain knowledge about community programs and agencies which focus on developmental processes.
- 699 THESIS RESEARCH** 1-4 credits
(May be repeated) Prerequisite: departmental permission. Research analysis of data and preparation of thesis for master's degree.
- 700 SURVEY OF PROJECTIVE TECHNIQUES** 4 credits
Prerequisite: 630 or instructor's permission. Introduction to rationale, assumptions and ethics, and research of projective testing. Elementary administration, scoring and interpretation of Rorschach, and survey of other important contemporary projective instruments.
- 701 PSYCHODIAGNOSTICS** 4 credits
Prerequisite: 700. Application of psychological testing to problems of diagnosis and evaluation. Practical experience in administration, scoring and interpretation. Integration of projective data with other assessment techniques in variety of settings.
- 706 CURRENT ISSUES IN COUNSELING** 4 credits
Prerequisite: 630. Advanced study of the background, theoretical foundations, techniques, research and applications of counseling psychology as a science and profession.
- 707 SUPERVISION IN COUNSELING PSYCHOLOGY I** 3 credits
Prerequisite: doctoral standing or permission of instructor. Instruction and experience in supervising a graduate student in counseling.
- 710 THEORIES OF COUNSELING AND PSYCHOTHERAPY** 4 credits
Prerequisite: 630 or departmental permission. Major systems of individual psychotherapy explored within a philosophy of science framework: Freudian, behavioral, Rogerian, cognitive, and other. Includes research, contemporary problems and ethics.
- 711 VOCATIONAL BEHAVIOR** 4 credits
Prerequisite: 630 or departmental permission. Theories and research on vocational behavior and vocational counseling. Topics include major theories of vocational behavior, empirical research on these theories, applied work in vocational counseling and applied research.
- 712 PRINCIPLES AND PRACTICE OF INDIVIDUAL INTELLIGENCE TESTING** 4 credits
Prerequisites: 630 or graduate standing in school psychology, and instructor's permission. History, principles and methodology of intelligence testing, supervised practice in administration, scoring and interpretation of individual intelligence tests for children and adults.
- 713 ADVANCED SEMINAR IN COUNSELING PSYCHOLOGY** 4 credits
Prerequisite: doctoral standing or permission. Examination of major issues in the field such as the counselor as a professional and as a person, and issues, problems and trends in counseling.
- 714 OBJECTIVE PERSONALITY EVALUATION** 4 credits
Prerequisites: Completion of 400/500, 420/520; and 750 or 5600:645; or permission of instructor. Study of the development, administration, and interpretation of objective instruments for personality assessment (MMPI, CPI, MBTI, 16 PF and selected additional inventories).
- 715 RESEARCH DESIGN IN COUNSELING I** 3 credits
Prerequisite: doctoral standing or permission. Study of research designs, evaluation procedures, and review of current research.

- 725 DEVELOPMENTAL PSYCHOLOGY: PRENATAL, INFANCY AND EARLY EXPERIENCE** 4 credits
Prerequisite: 620 or permission. Survey of psychological aspects of prenatal period, infancy and early experience. Emphasis on understanding how early experience structures adult behavior.
- 728 CHILD PSYCHOLOGY** 4 credits
Prerequisite: 620 or permission. Current research in child psychology covered with some emphasis on cognitive development. Topics include language, memory, intelligence, hyperactivity and selected aspects of social development.
- 727 PSYCHOLOGY OF ADULTHOOD AND AGING** 4 credits
Prerequisite: 620 or permission. Aspects of development, aging with emphasis on life-span methodology and research design including age-related changes in intelligence, personality, sensation, perception, learning, memory and socialization and intervention approaches.
- 728 SOCIAL DEVELOPMENTAL PSYCHOLOGY** 4 credits
Prerequisite: 620 or permission. Examination of selected theoretical and methodological issues in study of social psychology from developmental perspective. Topics include attitude formation, sex roles, moral development, altruism, aggression, attraction, attribution processes, nonverbal behavior and cultural effects.
- 730 THEORIES OF LEARNING** 4 credits
Prerequisite: 620 or departmental permission. Contemporary review of research and theory in language and memory. Process-oriented approach adopted with emphasis on developmental issues.
- 731 COGNITIVE DEVELOPMENT** 4 credits
Prerequisite: 620 or permission. Theory and research concerning development of cognitive activities including concept formation, problem solving and thinking. Topics include major theories, research paradigms, methods of investigation and reviews of empirical findings.
- 733 DEVELOPMENTAL BIOPSYCHOLOGY** 4 credits
Prerequisites: 620, 640 and graduate standing in psychology or permission of instructor. Survey of behavioral changes over life span with emphasis on physical, biological and physiological correlates of such change. Topics include central nervous system, skeletal and circulatory changes; metabolic and nutritional processes and endocrine mechanisms.
- 738 THE PSYCHOLOGY OF MENTAL RETARDATION** 4 credits
Prerequisite: 620 or graduate standing in psychology or permission of instructor. Current knowledge about the cognitive and social development of retarded individuals is examined. The first half of the course is a broad survey emphasizing methodology and findings about the mentally retarded. The second half involves an in-depth exploration of selected applied and basic research topics such as reaction to failure, mainstreaming, sexuality, training, behavioral problems, knowledge and thinking.
- 737 THE PSYCHOLOGY OF LEARNING DISABILITIES** 4 credits
Prerequisite: 620 or graduate standing in psychology or permission of instructor. Examination of the theories and research regarding learning and reading disabilities. Emphasis is on a critical evaluation of the research which investigates hypothesized process differences between learning-disabled and normal-achieving children.
- 738 APPLIED DEVELOPMENTAL PSYCHOLOGY** 4 credits
Prerequisites: 620 and graduate standing in psychology or permission of instructor. Examination of methodologies and research utilized in applied developmental settings. Topics include field methodologies, evaluation, child abuse, early intervention, day care, kibbutzim, social networks, subcultural variations and hospice/dying.
- 740 INDUSTRIAL GERONTOLOGY** 4 credits
Prerequisites: 610 and 620, graduate standing in psychology or departmental permission for other students who have completed 610 and 620. Study of age-related issues in work involving adult and older adult workers. Topics include personnel selection, training, motivating and appraising older employees; health and safety; job design, vocational guidance; and retirement.
- 741 SURVEY OF COUNSELING METHODS** 4 credits
Prerequisites: 620 and 630; graduate standing in psychology or permission of instructor. An experiential survey of treatment methods from a variety of theoretical approaches. Approaches include, but are not limited to, behavioral, gestalt, cognitive and psychodynamic methods.
- 750 ADVANCED PSYCHOLOGICAL TESTS AND MEASUREMENTS** 4 credits
Prerequisites: 610 and graduate standing in psychology or departmental permission for other students who have completed 610. Analysis of test construction techniques and statistical analyses of tests with a review of published tests and measurements used in psychology. Study of psychometric theory and principles.
- 751 ORGANIZATIONAL PSYCHOLOGY** 4 credits
Prerequisites: 610 and graduate standing in psychology or departmental permission for other students who have completed 610. Applies the general systems theory framework to the study of the relationships between organizational characteristics and human behavior, the internal processes of organizations and the relationships between organizations and their environment.
- 752 PERSONNEL SELECTION AND PERFORMANCE EVALUATION** 4 credits
Prerequisites: 610 and graduate standing in psychology or permission for other students who have completed 610. Review of strategies employed by industrial/organizational psychologists for personnel selection, placement and promotion. Survey of objective and subjective criteria used in performance appraisal including test validation and training effectiveness.
- 753 TRAINING AND ORGANIZATIONAL DEVELOPMENT** 4 credits
Prerequisites: 610 and graduate standing in psychology or permission for other students who have completed 610. Review of industrial training methods and techniques in terms of learning theory, with consideration of techniques to evaluate these training and organizational development programs.
- 754 RESEARCH METHODS IN PSYCHOLOGY** 2-4 credits
Prerequisites: 610, 620 and graduate standing in psychology or permission. Scientific method and its specific application to psychology. Topics include data collection, validity, reliability, use of general linear model and its alternatives and power analysis.
- 755 COMPUTER APPLICATIONS IN PSYCHOLOGICAL RESEARCH** 4 credits
Prerequisites: 610 and graduate standing in psychology or permission for other students who have completed 610. Practicum in application of computers to psychological research including data collection, analysis and interpretation. Also covers computer simulation of decision making including use of different models.
- 756 ROLE OF ATTITUDES AND VALUES IN INDUSTRIAL/ ORGANIZATIONAL PSYCHOLOGY** 4 credits
Prerequisites: 610 and graduate standing in psychology or departmental permission for other students who have completed 610. Consideration of the role of attitudes and values in the prediction of behavior including consumer psychology, explaining attitude changes, measurement of attitudes and the use of survey methodology.
- 757 ORGANIZATIONAL MOTIVATION AND LEADERSHIP** 4 credits
Prerequisites: 610 and graduate standing in psychology or departmental permission for other students who have completed 610. Survey of theories of motivation specifying both the intrinsic and extrinsic determinants of worker motivation. The leadership process and its relation to motivation, group performance and attributions is also analyzed.

- 758 ENGINEERING PSYCHOLOGY AND JOB DESIGN** 4 credits
Prerequisites: 610 and graduate standing in psychology or permission for other students who have completed 610. Survey of field of engineering psychology. Covers such topics as job design, task analysis, man-machine systems analysis, working conditions and accidents.
- 759 JOB EVALUATION AND EQUAL PAY** 4 credits
Prerequisite: 610. Major job evaluation systems will be reviewed and critiqued. Issues such as minimum qualifications for a job will be reviewed. Advantages and disadvantages of various job evaluation systems will be compared. Issues concerning federal regulation including the Equal Pay Act, comparable worth and other issues will be discussed. Regression approaches to job evaluation and applicable court cases will be reviewed.
- 760 ORGANIZATIONAL CHANGE AND TRANSFORMATION** 4 credits
Prerequisites: 610 or permission. Survey of theories and introduction to practical methods of organizational change and transformation used to increase organizational effectiveness and improve employee quality of work life.
- 760 GRADUATE SEMINAR IN PSYCHOLOGY** 1-4 credits
(May be repeated) Prerequisites: graduate standing in psychology and permission. Special topics in psychology.
- 795 ADVANCED COUNSELING PRACTICUM** 4 credits
(May be repeated) Prerequisites: 671, 672, 673 and permission of instructor. This course provides graduate students in counseling with actual client contacts and supervisory experiences under faculty supervision.
- 796 COUNSELING PSYCHOLOGY PRACTICUM** 4 credits
(May be repeated.) Prerequisite: 795 (eight hours) or 5600:675 (five hours). Advanced counseling psychology students will have supervised training with clients in a variety of settings and will focus on supervised development of specialized theoretical applications.
- 797 INDEPENDENT READING AND/OR RESEARCH** 1-3 credits
(May be repeated) Prerequisite: permission. Individual readings and/or research on a topic under supervision of faculty member with whom specific arrangements have been made.
- 899 DISSERTATION RESEARCH** 1-12 credits
Prerequisite: open to a properly qualified student. Required minimum 12 credits; maximum subject to departmental approval. Supervised research on topic deemed suitable by the dissertation committee.

SOCIOLOGY

3850:

- 503 HISTORY OF SOCIOLOGICAL THOUGHT** 3 credits
Prerequisite: 100 or permission. Examination of major scholars in the classical sociological tradition. Lecture.
- 504 CONTEMPORARY SOCIOLOGICAL THEORIES** 3 credits
Prerequisite: 403 or permission. Examination and critical evaluation of works of modern sociological theorists, emphasizing current theoretical approaches to issues of social order and social change. Lecture.
- 510 SOCIAL STRUCTURES AND PERSONALITY** 3 credits
Prerequisite: 100 or permission. Interrelationships between position in society, personality characteristics. Personality treated as both result and determinant of social structure and process. Lecture.
- 511 SOCIAL INTERACTION** 3 credits
Prerequisite: 100 or permission. Intensive study of advanced theory and research in social psychology, particularly how social interaction and self-conception affect one another. Lecture.
- 512 SOCIALIZATION: CHILD TO ADULT** 3 credits
Prerequisite: 100 or permission. Theoretical and empirical analyses of process by which infant, child, adolescent and adult learn social and cultural requirements necessary to function in new roles, changing roles and society in general.
- 521 RACIAL AND ETHNIC RELATIONS** 3 credits
Prerequisite: 100 or permission. Analysis of structure and dynamics of race and ethnic relations from a variety of perspectives emphasizing both historical and contemporary issues. Lecture.
- 523 SOCIOLOGY OF WOMEN** 3 credits
Prerequisites: 100 or permission of instructor. Examination of research and theories pertaining to women's status in society, including economic conditions, the relationship between structure and experience, and other gender-related issues.
- 525 SOCIOLOGY OF URBAN LIFE** 3 credits
Prerequisite: 100 or permission. Emergence and development of urban society. Examination of urban social structure from neighborhood to metropolis, the problems and prospects. Emphasis on various life styles of urban subcultures. Lecture/discussion.
- 528 THE VICTIM IN SOCIETY** 3 credits
Prerequisites: 100 or permission of instructor. Study of the nature, causes, and consequences of victimization with special focus on crime victimization.
- 529 PROBATION AND PAROLE** 3 credits
Prerequisite: 330 or 430 or permission. Analysis of how probationers and parolees are selected, supervised and then released into private life. Emphasis on current and past social research. Lecture/discussion.
- 530 JUVENILE DELINQUENCY** 3 credits
Prerequisite: 100 or permission. Analysis of social structure and process from which delinquency develops. Emphasis on current and past research. Lecture/discussion.
- 531 CORRECTIONS** 3 credits
Prerequisite: 330 or 430. Theories, belief systems, correctional practices and effectiveness as related to offender groups. Lecture/discussion/field experience.
- 533 SOCIOLOGY OF DEVIANT BEHAVIOR** 3 credits
Prerequisites: 100 and at least six additional credits of sociology courses or permission. Survey of theories of deviant behavior and relevant empirical research. Special emphasis given to interaction processes and social control. Lecture.
- 540 SOCIOLOGY OF RELIGION** 3 credits
Prerequisite: 100 or permission. Study of forms of religion and their social functions with emphasis on religion in American society. Lecture.
- 541 SOCIOLOGY OF LAW** 3 credits
Prerequisites: 100 and at least six additional credits of sociology courses or permission. Social origins and consequences of law and legal processes. Emphasis on uses of law, social change and aspects of legal professions. Lecture.

- 542 SOCIOLOGY OF EDUCATION** 3 credits
Prerequisite: 100 or permission. Analysis of education from an organizational and social psychological perspective. Topics include: desegregation; busing; neighborhood schools; impact of family, peers and teachers on learning; school organization. Lecture.
- 543 INDUSTRIAL SOCIOLOGY** 3 credits
Prerequisite: six credits of sociology or industrial management. Comparison of formal and informal structures in industrial organizations; analysis of work roles and status systems; communication processes; relation of work plant to community and society. Lecture.
- 544 SOCIAL ISSUES IN AGING** 3 credits
Prerequisite: 100 or permission. A look into the major issues and problems facing older persons. Special attention is given to the unmet needs of the elderly as well as an examination of current societal policy and programs to meet these needs.
- 550 SOCIOLOGY OF MENTAL ILLNESS** 3 credits
Prerequisite: 100 or permission. The social history of the mental hospital, theories and epidemiology of mental illness, community-based treatment models, the organization of mental health services, the role of personal social networks and mutual support groups.
- 584 WORKSHOP IN SOCIOLOGY** 1-3 credits
(May be repeated) Group studies of special topics in sociology. May not be used to meet departmental undergraduate or graduate requirements. May be used for elective credit only.
- 600 FUNDAMENTALS OF SOCIOLOGY** 3 credits
Accelerated introduction to sociology for the graduate student deficient in sociological background or from other disciplines who intends to take further graduate courses in sociology. Lecture.
- 603 SOCIOLOGICAL RESEARCH METHODS** 3 credits
Advanced research methods including advanced statistical techniques. Lecture/laboratory.
- 604 SOCIAL RESEARCH DESIGN** 3 credits
Intensive analysis of problems in a research design, i.e., those encountered in thesis preparation. Seminar or dissertation.
- 607 COMPUTER APPLICATIONS IN SOCIAL SCIENCES** 3 credits
Prerequisite: elementary statistics course or permission of instructor. Introduction to computers and their applications in social sciences. (Same as KSU 72214) Seminar.
- 613 SOCIOLOGY OF PROGRAM EVALUATION AND PROGRAM IMPROVEMENT** 3 credits
Prerequisite: permission. Program evaluation as it occurs in different social programs. Topics include history of evaluation, value assumptions, political dimensions, ethical issues, social change, use of experimentation and alternatives and the use for program development. Seminar.
- 615 EPIDEMIOLOGIC METHODS IN HEALTH RESEARCH** 3 credits
Prerequisite: permission. Designed to introduce the student to methods of developing and understanding information concerning the distribution of illness and injury in society and evaluations of interventions to reduce the burden.
- 617 SOCIOLOGICAL THEORY** 3 credits
Examination of the classical theoretical statements that form the foundation of sociological theory. Emphasis on classic sociological theory and its contributions to contemporary theory and research. Seminar.
- 620 GENERAL SYSTEMS THEORY** 3 credits
Analysis of general systems theory as basis for a model of society and as heuristic framework for theory and research. (Same as KSU 72108) Seminar.
- 631 SOCIAL PSYCHOLOGY** 3 credits
Intensive examination of social psychological theory and research, both classic and contemporary. Provides student with background and working knowledge of social psychological aspects of social phenomena. (Same as KSU 72430) Seminar.
- 632 SMALL GROUP THEORY** 3 credits
Prerequisite: permission. Theoretical and applied aspects of small group dynamics. Topics include leadership emergence, effective group development and functioning, power, norms and individual behavior, among others. (Same as KSU 72432) Seminar.
- 634 PERSONALITY AND SOCIAL SYSTEMS** 3 credits
Examination of contemporary theory and research on linkages between personality and society. Some applications in studies of modernization, social class and occupations and sex roles. (Same as KSU 72433) Seminar.
- 635 SOCIOLOGY OF COMMUNICATION** 3 credits
Examination of communication media, content, audiences and impact within sociological context. (Same as KSU 72434) Seminar.
- 636 CRITIQUE OF MASS COMMUNICATIONS RESEARCH** 3 credits
Prerequisite: permission. Systematic evaluation of theoretical, methodological and empirical aspects of significant studies of mass communication. (Same as KSU 72876) Seminar.
- 639 SOCIOLOGY OF SEX ROLES** 3 credits
Prerequisite: permission. Advanced review of theories and research on origins, characteristics and changes in sex roles. Emphasis on recent empirical research on sex role patterns and processes in Western industrial societies. Seminar.
- 645 SOCIAL ORGANIZATION** 3 credits
General survey of major theories, concepts and problems pertaining to creation, alteration and dissolution of social organization at various levels of size and complexity. (Same as KSU 72540) Seminar.
- 648 SOCIAL STRATIFICATION** 3 credits
Prerequisite: permission. Seminar dealing with social class and castes with special reference to American social structure. (Same as KSU 72546) Seminar.
- 648 COMPLEX ORGANIZATIONS** 3 credits
Prerequisite: permission. Organizations as social systems; their effect on individuals. Problems of professionals in bureaucracies. (Same as KSU 72545) Seminar.
- 649 SOCIOLOGY OF WORK** 3 credits
Examination of work as behavioral phenomenon in human societies; contrasts with non-work and leisure; significance of occupations, professions and work types in organization of work. (Same as KSU 72542) Seminar.
- 651 SEMINAR IN RACE RELATIONS** 3 credits
Prerequisite: permission. Analysis of the structure and dynamics of race and ethnic relations with attention given to both historical and contemporary issues. (Same as KSU 72870) Seminar.
- 652 CONFLICT** 3 credits
Prerequisite: permission. Current conceptions of human conflict. Discussion of vital concepts and principles for understanding conflict phenomena. Power, values, ideology, riots, revolution and war. (Same as KSU 72875) Seminar.
- 656 MEDICAL SOCIOLOGY** 3 credits
Prerequisite: permission of instructor. A general survey of the field of medical sociology with special emphasis on application of sociological concepts and methods as tools to aid in the analysis of health and health care in the contemporary urban United States. (Same as KSU 72323).
- 657 URBAN HEALTH CARE** 3 credits
Prerequisite: permission. Relationships between urban social structures and processes and organization and functioning of health-care delivery systems in urbanized nations. Seminar.
- 658 FIELD RESEARCH IN URBAN LIFE STYLES** 3 credits
Prerequisite: permission. Examination of various life styles in contemporary urban society. Explores issues of theory and methodology in urban life-styles research through evaluation of both classic and contemporary studies. Includes application of concepts and techniques in actual field research. Seminar.
- 663 DEVIANCE AND DISORGANIZATION** 3 credits
Prerequisite: permission. Examination of nature and types of deviance. Problems and issues in theory and research. (Same as KSU 72760) Seminar.
- 684 SOCIOLOGY OF CRIMINAL BEHAVIOR** 3 credits
Analysis of relationship of crime and delinquency to social structure and social processes. Responses by criminal justice agencies. Seminar.
- 657 URBAN HEALTH CARE** 3 credits
Prerequisite: permission. Relationships between urban social structures and processes and organization and functioning of health-care delivery systems in urbanized nations. Seminar.
- 658 FIELD RESEARCH IN URBAN LIFE STYLES** 3 credits
Prerequisite: permission. Examination of various life styles in contemporary urban society. Explores issues of theory and methodology in urban life-styles research through evaluation of both classic and contemporary studies. Includes application of concepts and techniques in actual field research. Seminar.
- 663 DEVIANCE AND DISORGANIZATION** 3 credits
Prerequisite: permission. Examination of nature and types of deviance. Problems and issues in theory and research. (Same as KSU 72760) Seminar.
- 684 SOCIOLOGY OF CRIMINAL BEHAVIOR** 3 credits
Analysis of relationship of crime and delinquency to social structure and social processes. Responses by criminal justice agencies. Seminar.

- 665 JUVENILE DELINQUENCY: THEORY AND RESEARCH** 3 credits
Prerequisite: permission. Analysis of theories of delinquency; ecological, class structural, sub-structural, etc. Review of relevant research also presented. Seminar.
- 666 SOCIOLOGY OF CORRECTIONS** 3 credits
Prerequisite: permission. Analysis of correctional institution as social system; its formal structure and informal dynamics. Analysis of present state of corrections research. Seminar.
- 677 FAMILY ANALYSIS** 3 credits
Analysis and evaluation of sociological theory and research in the family. Concentration on techniques of theory construction and research design in sociological study of the family. (Same as KSU 72543) Seminar.
- 678 SOCIAL GERONTOLOGY** 3 credits
Prerequisite: permission. Impact of aging upon individuals and society. Reactions of individuals and society to aging. (Same as KSU 72877) Seminar.
- 679 POLITICAL SOCIOLOGY** 3 credits
Description, analysis and interpretation of political behavior through application of sociological concepts. (Same as KSU 72544) Seminar.
- 680 SOCIOLOGY OF EDUCATION** 3 credits
Selected problems in sociological analysis of educational systems. Emphasis on such social determinants of learning as class, race, family and peer subcultures. (Same as KSU 72547) Seminar.
- 681 CROSS CULTURAL PERSPECTIVES IN AGING** 3 credits
Prerequisite: permission. A comparison of aging in various cultures and societies around the world.
- 686 POPULATION** 3 credits
Analysis of basic population theory and methods. Trends and differentials in fertility, mortality, migration and selected social demographic variables also considered. (Same as KSU 72656) Seminar.
- 687 SOCIAL CHANGE** 3 credits
Advanced seminar in theories of social change. (Same as KSU 72320) Seminar.
- 688 HUMAN ECOLOGY** 3 credits
Selected problems in analysis of social behavior in relation to physical environment. Overview of theory, methods and applications of human ecology. (Same as KSU 72650) Seminar.
- 689 URBAN ECOLOGY** 3 credits
Seminar in theory and measurement of social ecology of urban areas. Emphasis on trends and differentials in distribution of social and organizational behavior in urban America. Seminar.
- 697 READINGS IN CONTEMPORARY SOCIOLOGICAL LITERATURE** 1-3 credits
Prerequisites: seven credits of sociology and permission of adviser, instructor and head of department. Intensive reading and interpretation of written material in student's chosen field of interest. Regular conferences with instructor.
- 698 DIRECTED RESEARCH** 1-3 credits
(May be repeated) Prerequisite: permission. Empirical research to be conducted by the student under graduate faculty supervision.
- 699 THESIS** 2-6 credits
(May be repeated for a total of six credits) Prerequisite: permission. Supervised thesis writing.
- 700 COLLEGE TEACHING OF SOCIOLOGY** 2 credits
Prerequisite: teaching assistant or permission. Training and experience in college teaching of sociology. Not approved as credit toward a degree. Seminar.
- 705 THEORY AND MEASUREMENT OF SOCIAL ATTITUDES** 3 credits
Prerequisites: 603 and 604, or permission. Seminar in theories of social attitudes and techniques for their measurement. (Same as KSU 72213) Seminar.
- 706 MULTIVARIATE TECHNIQUES IN SOCIOLOGY** 3 credits
Prerequisites: 603 and 604, or permission, a sociology graduate student only. Methodological problems using advanced multivariate techniques in analysis of sociological data. Topics include nonexperimental causal analysis such as recursive and nonrecursive path analysis. (Same as KSU 72217).
- 707 MEASUREMENT IN SOCIOLOGY** 3 credits
Prerequisite: 706 or permission. Theory and methods of measurement reliability and validity in social data. Topics include estimating reliability and validity, scale and item design, alternative measurement strategies, measurement models. Seminar.
- 708 ADVANCED TECHNIQUES IN RESEARCH** 1-3 credits
Prerequisite: permission. Selected topics in advanced, multivariate statistical analysis and in strategies of sociological research. Emphasis on current trends and innovations in research techniques. (Same as KSU 72216) Seminar.
- 709 ANALYSIS OF SOCIOLOGICAL DATA** 3 credits
Prerequisite: 706 or permission. Critical examination of data analysis techniques having particular relevance to research problems in sociology. (Same as KSU 72218) Seminar.
- 710 SOCIAL SAMPLING** 3 credits
Prerequisites: 603, 604 or permission. Theory and methods of sampling in sociology. Topics include sample design, sampling efficiency, nonresponse, mortality in longitudinal designs, urban, organizational, and survey sampling, stratified and cluster sampling. Seminar.
- 711 SURVEY RESEARCH METHODS** 3 credits
Prerequisites: 603 and 604, or permission. In-depth study of design and administration of social surveys. (Same as KSU 72220) Seminar.
- 712 EXPERIMENTAL AND QUASI-EXPERIMENTAL RESEARCH IN SOCIOLOGY** 3 credits
Prerequisites: 603, 604 or permission. Application of experimental and quasi-experimental methods in sociological research with special attention given to appropriate designs, statistical analyses and empirical literature. Seminar.
- 714 QUALITATIVE METHODOLOGY** 3 credits
Prerequisites: 603, 604 or permission. Theory building and theory testing through the application of such techniques as participant-observation, open-ended interviewing, content analysis, historiography (diaries, records from churches, schools, social agencies, and other contemporary sources) and qualitative statistics. (Same as KSU 72219) Seminar.
- 718 THEORY CONSTRUCTION** 3 credits
Study of rules and methods for constructing scientific theory. Emphasis on writings of scientists and philosophers of science and application of these ideas to development of sociological theories. (Same as KSU 72107) Seminar.
- 721 SPECIAL TOPICS IN SOCIOLOGICAL THEORY** 1-3 credits
Open course to cover content area not readily subsumable under other headings. Content of course to be determined by instructor. (Same as KSU 72195) Seminar.
- 722 EARLY SOCIOLOGICAL THOUGHT** 3 credits
Prerequisite: 617 or permission. Two to four major sociological thinkers prior to 1930 examined in depth. Specific persons considered will be chosen by instructor but will be announced well in advance of beginning of class. (Same as KSU 72191) Seminar.
- 723 SCHOOLS OF SOCIOLOGICAL THOUGHT** 3 credits
(May be repeated once for credit) Prerequisite: 617 or permission. Two distinct schools of sociological thought will be selected by the instructor for in-depth reading and comparative analysis. (Same as KSU 72105) Seminar.
- 733 SMALL GROUP RESEARCH TECHNIQUES** 3 credits
Prerequisite: 632. Application and implications of research in small groups. Focus on both laboratory and field studies. Seminar/laboratory.
- 737 CONTEMPORARY TRENDS IN SOCIAL PSYCHOLOGY** 1-3 credits
Selected topics on significant contemporary issues, theories and methodological developments in social psychology. (Same as KSU 72495) Seminar.
- 738 RESEARCH IN SOCIAL PSYCHOLOGY** 1 credit
Prerequisite: 631. Design and development of a research project oriented to empirically examining selected concepts in social psychology or to testing selected propositions in social psychology. (Same as KSU 72431) Research.
- 747 URBAN SOCIOLOGY** 3 credits
Analysis of theories of urban process and review of major contributions to empirical analysis of urban life. (Same as KSU 72659) Seminar.
- 750 RESEARCH IN COMMUNITY AND AREA PROBLEMS** 3 credits
Prerequisite: permission. Special investigation of community, area or regional problems; design and execution of small projects. (Same as KSU 72655) Seminar.
- 753 SPECIAL TOPICS IN SOCIAL ORGANIZATION** 1-3 credits
Open course to cover content area not readily subsumable under other headings. Content of course to be determined by instructor. (Same as KSU 72595) Seminar.
- 754 ISSUES IN URBAN ANALYSIS** 1-3 credits
Special topics seminar dealing with current and special topics in urban process and its analysis. Seminar.
- 755 RESEARCH IN SOCIAL ORGANIZATION** 1 credit
Prerequisite: 645. Design and development of a research project oriented to empirically examining selected concepts in social organization or to testing selected propositions in social organization. (Same as KSU 72541) Research.
- 756 SEMINAR IN URBAN PROCESSES** 3 credits
Prerequisite: Ph.D. standing in sociology or permission. Critical examination of current research and theory related to urban life, special emphasis on social change in urban environment. (Same as KSU 72691) Seminar.
- 767 SPECIAL TOPICS IN DEVIANCE AND DISORGANIZATION** 1-3 credits
Designed to meet needs of student with interest in selected topics in deviance and disorganization. (Same as KSU 72795) Seminar.
- 768 RESEARCH IN DEVIANCE AND DISORGANIZATION** 1 credit
Prerequisite: 663. Provides for analysis of research problems in deviance and disorganization and for development of research project in above area. (Same as KSU 72761) Research.
- 790 CONTEMPORARY ISSUES IN SOCIAL CHANGE** 1-3 credits
Prerequisite: 687 or permission. Varying topics focusing on current research and theory in field of social change. Advanced notice in specific content will be provided by instructor. (Same as KSU 82329) Seminar.
- 791 RESEARCH IN SOCIAL CHANGE** 1 credit
Prerequisite: 687. Continuation of 687. Student prepares a major research paper based on theoretical material covered in 790 and presents it for discussion to the seminar. Research.
- 792 RESEARCH IN HUMAN ECOLOGY** 1 credit
Prerequisite: 688. Intensive research on selected aspect of human ecology by individual student with previous training in this area. Topic to be arranged between student and instructor. Research.
- 797,8 INDIVIDUAL INVESTIGATION** 1-3 credits each
Prerequisites: one semester of graduate work, permission of instructor, adviser and head of department. Readings and/or research supervised by member of graduate faculty. (Same as KSU 72896)
- 899 DISSERTATION** 1-10 credits
(Must be repeated for a minimum of 30 credits) Dissertation. (Same as KSU 82199)

ANTHROPOLOGY

3870:

- 505 HISTORY AND THEORY IN ANTHROPOLOGY** 3 credits
Prerequisite: 150 or permission. Survey of theories and problems in social and cultural anthropology. Historical development, methods of inquiry and contemporary theoretical perspectives.
- 555 CULTURE AND PERSONALITY** 3 credits
Prerequisite: 150 or permission. Examination of functional and causal relationships between culture and individual cognition and behavior. Lecture.
- 557 CULTURE AND MEDICINE** 3 credits
Prerequisite: 150 or permission of instructor. Analyzes various aspects of Western and non-Western medical systems from an anthropological perspective. Compares traditional medical systems around the world.
- 561 LANGUAGE AND CULTURE** 3 credits
Prerequisite: 150 or permission. Examination of language structure and interaction of language, cognition and culture. Lecture.
- 563 SOCIAL ANTHROPOLOGY** 3 credits
Prerequisite: 150 or permission. Comparative structural analysis of non-Western systems of kinship and social organization in terms of status, role, reciprocal expectation, nomenclature, nuclear and extended households and other kinship groupings. Lecture.
- 572 SPECIAL TOPICS: ANTHROPOLOGY** 3 credits
(May be repeated) Prerequisites: 150 and permission. Designed to meet needs of student with interests in selected topics in anthropology. Offered irregularly when resources and opportunities permit. May include archaeological field school, laboratory research or advanced course work not presently offered by department on regular basis.

- 594 WORKSHOP IN ANTHROPOLOGY** 1-3 credits
(May be repeated) Group studies of special topics in anthropology. May not be used to meet departmental undergraduate or graduate major requirements. May be used for elective credit only.
- 651 SEMINAR IN ANTHROPOLOGICAL THEORIES AND METHODS** 3 credits
Major theoretical viewpoints in cultural anthropology. Nature, scope of research problems. Survey of methods in field work. Seminar.
- 697 INDIVIDUAL INVESTIGATION** 1-3 credits
Prerequisites: permission of instructor and head of department. Intensive reading and/or research in student's chosen field of interest. Regular conferences with instructor. Preparation of a research paper.

URBAN STUDIES

3980:

- 590 WORKSHOP** 1-3 credits
(May be repeated) Group studies of special topics in urban studies. May not be used to meet graduate major requirements in urban studies. May be used for elective credit only.
- 600 BASIC ANALYTICAL RESEARCH** 3 credits
Prerequisite: permission. Examines basic framework of social science research methodologies and basic complementary statistical techniques, including probability and sampling most useful in urban studies.
- 601 ADVANCED RESEARCH AND STATISTICAL METHODS** 3 credits
Prerequisite: 600. Extends study of social science to include more advanced research designs and multivariate statistical techniques.
- 602 AMERICAN URBAN DEVELOPMENT** 3 credits
Examination of major literature on processes of urbanization in United States and selected facets of urban institutional development.
- 610 LEGAL FOUNDATIONS OF PUBLIC ADMINISTRATION** 3 credits
Prerequisite: permission. Introduction to the legal foundations and context of public administration, including the interaction of the course, public organizations, public administration and the public.
- 611 INTRODUCTION TO THE PROFESSION OF PUBLIC ADMINISTRATION** 3 credits
Prerequisite: permission. Introduction to the theory and practice of the field of public administration. Foundation course for later MPA study.
- 612 NATIONAL URBAN POLICY** 3 credits
Prerequisite: permission. Major federal policies that relate to urban problems examined in regard to policy-making processes, implementation and impact.
- 613 INTERGOVERNMENTAL MANAGEMENT** 3 credits
Prerequisite: permission. Examines the field of intergovernmental relations as it applies to urban administration and management.
- 614 ETHICS AND PUBLIC SERVICE** 3 credits
Prerequisite: permission. Examination of the ethical problems and implications of decisions and policies made by those whose actions impact on the broad public. Case studies of decision making in both the public (government) and private (business and the professions) spheres are studied in relation to classical literature in ethical theory.
- 615 PUBLIC ORGANIZATION THEORY** 3 credits
Prerequisites: 611 and 610 or equivalent. Examines the development of public organizational theory, and the current status of theoretical developments in the field of public administration.
- 616 PERSONNEL MANAGEMENT IN THE PUBLIC SECTOR** 3 credits
Fundamental issues and principles of public sector personnel administration, including recruitment, selection, training, motivation, supervision, evaluation, labor relations and affirmative action.
- 617 LEADERSHIP AND DECISION-MAKING** 3 credits
Examines the context of public organizational management including relevant organizational theories, strategic management and planning and public sector leadership.
- 618 CITIZEN PARTICIPATION** 3 credits
The fundamental theory, background, techniques, and issues of citizen participation in urban policy-making.
- 620 SOCIAL SERVICES PLANNING** 3 credits
Prerequisite: permission. In-depth analysis of total social services requirements and various ways in which social services planning function is carried out in urban communities.
- 621 URBAN SOCIETY AND SERVICE SYSTEMS** 3 credits
Prerequisite: permission. Analysis of social bases of urban society; hierarchies, social problems, relationships to planning, public services.
- 622 URBAN PLANNING AND HEALTH CARE** 3 credits
Basic knowledge of the health service delivery system is provided for planners and administrators in the public sector.
- 630 INTRODUCTION TO PLANNING PRACTICE AND THEORY** 3 credits
Introduction to the history, theories and forms of urban planning.
- 631 FACILITIES PLANNING** 3 credits
Study of need, process and limitation of urban facilities planning.
- 632 LAND USE PLANNING LAW** 3 credits
Prerequisite: permission. Acquaint student with past and present approaches to land use control in the United States and examine the political, economic, social and legal forces which have shaped existing land-use legislation.
- 633 COMPARATIVE PLANNING** 3 credits
A survey of national, regional, and local planning institutions, plans and planning implementation measures in use in the developed world. Particular attention will be given to the planning experiences of European nations and their impact on American planning theory and practice.
- 636 PARKS AND RECREATION** 3 credits
Prerequisite: permission. Deals with theory, practice, evaluation of recreational administration, parks planning.
- 637 FIELD METHODS IN URBAN AND REGIONAL PLANNING** 3 credits
Prerequisite: 630. Taught jointly with 638 to provide students with extensive experience in applying the quantitative methods and analytic procedures of urban planning to actual public policy issues.
- 638 IMPLEMENTATION OF PLANNING TECHNIQUES** 3 credits
Prerequisite: 630. This course is taught jointly with 637 to provide students with extensive experience in applying quantitative methods and analytic procedures to urban planning to actual public policy issues.
- 640 FISCAL ANALYSIS** 3 credits
Prerequisite: permission. Study of revenue and expenditure patterns of the city's government.
- 641 URBAN ECONOMIC GROWTH AND DEVELOPMENT** 3 credits
Prerequisite: permission. Examination of urban economic unit and its susceptibility to social, economic, political and physical change.
- 642 PUBLIC BUDGETING** 3 credits
Prerequisite: permission. Current professional practice and theoretical issues in public budgeting and management of capital and operating budgets.
- 643 INTRODUCTION TO PUBLIC POLICY** 3 credits
Prerequisite: permission. Introduction to models of public policy formulation; identification of major policy issues; and the analysis of policy implementation and policy impact.
- 650 COMPARATIVE URBAN SYSTEMS** 3 credits
Prerequisite: permission. Conceptual schemes and methodology for comparative urban analysis among a number of major cities selected from each continent.
- 670 RESEARCH FOR FUTURES PLANNING** 3 credits
Prerequisites: 600 and 601 and completion of eight credits of core curriculum in urban studies. An overview of the techniques associated with the field of futures research and their application to long-term urban planning.
- 671 PROGRAM EVALUATION IN URBAN STUDIES** 3 credits
Prerequisite: 600 or equivalent. Major considerations appropriate for conducting evaluations of a wide variety of human service programs and policies affecting urban and metropolitan areas.
- 672 ALTERNATIVE URBAN FUTURES** 3 credits
Overview of topics and issues associated with alternative urban futures and their implications for planning and public policy in urban communities.
- 673 COMPUTER APPLICATIONS IN PUBLIC ORGANIZATIONS** 3 credits
Prerequisite: 600 and 601. Introduction to microcomputer applications in the public sector, including data entry, statistical analysis, report writing, graphical representation and spreadsheets.
- 674 ANALYTICAL TECHNIQUES FOR PUBLIC ADMINISTRATORS** 3 credits
Prerequisite: 600. Public sector applications of quantitative methods, including decision analysis, queuing theory, mathematical programming, and simulation.
- 680,1 SELECTED TOPICS IN URBAN STUDIES** 1-3 credits each
Prerequisite: permission. Selected topics in specific areas of urban planning, in various developmental processes of cities, or in various urban policy and administrative issues. (A maximum of 27 credits may be earned in 680 and 681.)
- 690 URBAN STUDIES SEMINAR** 3 credits
Prerequisites: 16 credits of urban studies core plus quantitative methods. Urban research methods applied to specific urban research area. Comprehensive paper required.
- 695 INTERNSHIP** 1-3 credits
(May be repeated for a total of three credits) Prerequisite: permission. Faculty-supervised work experience in which student participates in policy planning, administrative operations in selected urban, state and federal governments and urban agencies.
- 697 INDIVIDUAL STUDIES** 1-3 credits
(May be repeated for a total of four credits) Directed individual readings or research on specific area or topic.
- 699 THESIS** 3 credits
Prerequisite: permission of academic adviser. Research analysis of data and supervised preparation of thesis for master's degree. (May be repeated. No more than three credits applicable to degree.)
- 700 ADVANCED RESEARCH METHODS I** 3 credits
Prerequisite: master's level statistics or permission. Introduction to statistical techniques and methodologies in doctoral and postdoctoral research. Emphasis on conceptual and mathematical interrelationships.
- 701 ADVANCED RESEARCH METHODS II** 3 credits
Prerequisite: 700 or equivalent. Continuation of 700. Emphasis placed upon conceptual and mathematical interrelationships of multivariate statistical techniques as well as application of these techniques through computer analysis of urban data sets.
- 702 URBAN THEORY I** 3 credits
Prerequisite: permission. Review of major theoretical traditions examining urban problems; for students entering the doctoral program in urban studies (first in two-course sequence).
- 703 URBAN THEORY II** 3 credits
Prerequisite: 702. Review of major professional disciplines dealing with urban problems; for students entering the doctoral program in urban studies (second in two-course sequence).
- 704 PUBLIC BUREAUCRACY** 3 credits
Prerequisite: permission. Analysis of bureaucratic operations in the implementation of public policy, including special attributes of human service organizations and the democratic theory debate.
- 705 ECONOMICS OF URBAN POLICY** 3 credits
Prerequisite: master's level knowledge of macroeconomics and microeconomics or special permission. Use of research tools of economic analysis in seminar format to examine options available to urban policy makers in operation of public services and economic development of cities.
- 706 PROGRAM EVALUATION** 3 credits
Prerequisite: permission. Advanced treatment of topics in program evaluation.
- 707 URBAN PLANNING AND MANAGEMENT STRATEGIES** 3 credits
Prerequisite: permission. Analysis of urban planning policy issues and strategies for implementation in public policy formulation. Emphasis on use of planning process as integrative mechanism.
- 708 URBAN POLICY: THE HISTORICAL PERSPECTIVE** 3 credits
Prerequisite: permission. Critical examination of major ideas about the city from Aristotle to the 20th Century and of the impact on urbanization on society and public policy.
- 709 SYSTEMS AND PROCESSES OF POLICY ANALYSIS** 3 credits
Prerequisite: permission. Analysis of administrative processes within public organizations, federal, state and local in the United States; emphasis on urban community.
- 711 SEMINAR IN PUBLIC ADMINISTRATION** 3 credits
Prerequisite: permission. In depth review and critique of major intellectual traditions, concepts and theories underlying public administration in the United States.

- 714 SEMINAR IN POLICY ANALYSIS AND EVALUATION** 3 credits
Prerequisite: permission. In depth review and critique of major intellectual traditions, concepts and theories underlying policy analysis and evaluation in the United States.
- 715 SEMINAR IN URBAN AND REGIONAL PLANNING** 3 credits
Prerequisite: permission. In depth review and critique of major intellectual traditions, concepts and theories underlying urban and regional planning in the United States.
- 720 COMPARATIVE PLANNING STRATEGIES** 3 credits
Prerequisite: 715 or permission. Review and analysis of alternative planning theories, institutions, and implementation strategies in a variety of national settings.

- 799 URBAN TUTORIAL** 3 credits
Prerequisite: permission. Intensive study of a particular approved field or typical area of urban studies under the supervision of a tutor.
- 899 DISSERTATION RESEARCH** 1-15 credits
(May be repeated) Open to properly qualified student accepted as candidate for Doctor of Philosophy degree. Student must register for at least three credits each semester until dissertation is accepted. Minimum of 15 credits required.

College of Engineering

CHEMICAL ENGINEERING 4200:

- 561 SOLIDS PROCESSING** 3 credits
Prerequisites: 321 and 353 or permission. Comprehensive problems in sedimentation, fluidization, drying and other operations involving mechanics of particulate solids in liquid and gas continua.
- 563 POLLUTION CONTROL** 3 credits
Prerequisite: 353 or permission. Air and water pollution sources and problems. Engineering aspects and methodology.
- 566 DIGITIZED DATA AND SIMULATION** 3 credits
Prerequisite: permission. Data acquisition and analysis by digital devices, digital control applications and design.
- 570 ELECTROCHEMICAL ENGINEERING** 3 credits
Prerequisites: 322, 330. Chemical engineering principles as applied to the study of electrode processes and to the design of electrochemical reactors. Topics include electrochemical thermodynamics, cell polarizations, Faraday's Laws, electrode kinetics, transport processes in electrochemical systems, current distributions, reactor design, experimental methods, commercial processes, and batteries and fuel cells.
- 600 TRANSPORT PHENOMENA** 3 credits
Prerequisite: 322 or permission. Systematic presentation of conservation of momentum, energy and mass at microscopic and macroscopic levels in conjunction with illustrative examples and analogies.
- 605 CHEMICAL REACTION ENGINEERING** 3 credits
Prerequisite: 330 or permission. Kinetics of homogeneous and heterogeneous systems. Reactor design for ideal and non-ideal flow systems.
- 610 CLASSICAL THERMODYNAMICS** 3 credits
Prerequisite: 225. Discussion of laws of thermodynamics and their application. Prediction and correlation of thermodynamic data. Phase and reaction equilibria.
- 630 CHEMICAL PROCESS DYNAMICS** 3 credits
Prerequisite: 600. Development and solutions of mathematical models for chemical processes including models based on transport phenomena principles, population balance methods and systems analysis.
- 631 CHEMICAL ENGINEERING ANALYSIS** 3 credits
Prerequisites: 322, 225, 330. Mathematical analysis of problems in transport processes, chemical kinetics and control systems. Solution techniques for these problems and their practical significances are stressed. Heuristic proofs will be given for necessary theory developments.
- 632 NONLINEAR DYNAMICS AND CHAOS** 3 credits
Prerequisite: 3450.235. Description and analysis of the complex behavior exhibited by nonlinear equations. Emphasis is on the numerical methods to quantify chaos.
- 635 ADVANCED POLYMER ENGINEERING** 3 credits
Prerequisite: 322 or 600 or permission. Reactors for polymerization, polymer characterization, polymer processing, polymer rheology.
- 640 ADVANCED PLANT DESIGN** 3 credits
Prerequisite: permission. Topical treatment of process and equipment design, scale-up, optimization, process syntheses, process economics. Case problems.
- 696 TOPICS IN CHEMICAL ENGINEERING** 1-3 credits
(May be repeated for a total of six credits) Prerequisite: permission. Topics selected from new and developing areas of chemical engineering, such as electrochemical engineering, coal and synthetic fuels processing, bioengineering, simultaneous heat and mass transfer phenomena and new separation techniques.
- 696 SPECIAL PROBLEMS** 1-4 credits
(May be repeated for a total of four credits) Prerequisite: permission of department head. For the qualified candidate for M.S.Ch.E. degree. Designed to expand an area of interest by consultation with a faculty member and independent study with a faculty beyond available course work. Credit dependent upon nature and extent of project as determined by faculty member and department head.
- 699 MASTER'S THESIS** 1-6 credits
(May be repeated to a maximum of six credits) For properly qualified candidate for master's degree. Supervised original research in specific area of chemical engineering selected on basis of availability of staff and facilities.
- 701 ADVANCED TRANSPORT PHENOMENA** 3 credits
Prerequisite: 600. Advanced theory of transport phenomena such as applied tensor analysis, constitutive equations, multicomponent reactive transport and multiphase transport. Illustrative practical examples presented.
- 702 MULTIPHASE TRANSPORT PHENOMENA** 3 credits
Prerequisite: 600. General transport theorem, kinematics, Cauchy's lemmas and the jump boundary conditions are developed followed by the theory of volume averaging. The single phase equations are then volume averaged to obtain the multiphase equations of change. The technique for using these equations and their practical significance is also covered.
- 706 ADVANCED REACTION ENGINEERING** 3 credits
Prerequisite: 605. Kinetics of heterogeneous systems, steady and unsteady state mathematical modeling of chemical reactors, fluidization and additional topics drawn from current literature.
- 711 ADVANCED CHEMICAL ENGINEERING THERMODYNAMICS** 3 credits
Prerequisite: 610. Advanced topics in thermodynamics, including phase and reaction equilibria at high pressures, phase equilibrium for multiphase systems, reaction equilibria in multiphase systems, thermodynamics of surfaces, thermodynamics of systems under stress, non-equilibrium thermodynamics and current topics from literature.
- 715 MOMENTUM TRANSPORT** 3 credits
Prerequisite: 600. Discussion of potential flow, boundary layer formation and turbulent flow phenomena for Newtonian fluids.

- 716 NON-NEWTONIAN FLUID MECHANICS** 3 credits
Prerequisite: 600. Tensor and curvilinear coordinates. Newtonian viscometrics. Development of non-Newtonian constitutive equations. Special and general flows of various constitutive models.
- 720 ENERGY TRANSPORT** 3 credits
Prerequisite: 600. Conduction, natural and forced convection, and radiation heat transfer starting with equations of continuity, motion and energy.
- 721 TOPICS IN ENERGY TRANSPORT** 3 credits
Prerequisite: 720. Advanced analytical and graphical methods for solving complex heat transfer problems found in chemical engineering.
- 725 MASS TRANSFER** 3 credits
Prerequisite: 600. Theory of mass transfer with applications to absorption, adsorption, distillation and heterogeneous catalysis.
- 731 PROCESS CONTROL** 3 credits
Prerequisite: 630. Introduction to modern control theory of chemical processes including cascade control, multivariate control and data sampled control.
- 736 POLYMER ENGINEERING TOPICS** 3 credits
Prerequisite: permission. Selected topics of current interest in polymer engineering, such as modeling of reactors or processes, multiphase materials, multiphase flow, artificial fiber engineering, etc.
- 750 ADVANCED POLLUTION CONTROL** 3 credits
Prerequisite: 463 or permission. Analysis of current environmental research in analytical instrumentation, air and water, pollution control, hazardous waste treatment, and nuclear waste disposal.
- 794 ADVANCED SEMINAR** 1-4 credits
(May be repeated for a total of six credits) Prerequisite: permission of department head. Advanced projects, readings and other studies in various areas of chemical engineering. Intended for student seeking Ph.D. in engineering.
- 696 PRELIMINARY RESEARCH** 1-15 credits
(May be repeated for a total of 15 credits.) Prerequisite: approval of dissertation director. Preliminary investigations prior to the submission of a dissertation proposal to the Interdisciplinary Doctoral Committee.
- 899 DOCTORAL DISSERTATION** 1-15 credits
(May be taken more than once.) Prerequisite: acceptance of research proposal by the Interdisciplinary Doctoral Committee and approval of the dissertation director. Original research by the doctoral student.

CIVIL ENGINEERING 4300:

- 514 DESIGN OF EARTH STRUCTURES** 3 credits
Prerequisite: 314 or permission. Design of earth structures: dams, highway fills, cofferdams, etc. Embankment construction techniques, quality control, embankment analysis, instrumentation, foundation soil stabilization, seepage analysis and control. Design problem. Graduate students will perform more advanced analysis and design.
- 518 SOIL AND ROCK EXPLORATION** 3 credits
Prerequisite: 314 or permission. Site exploration criteria and planning. Conventional boring, sampling and in situ testing methods. Theory and application of geophysics and geophysical methods including seismic, electrical resistivity, gravity, magnetic and radioactive measurements. Air photo interpretation.
- 526 ENVIRONMENTAL ENGINEERING DESIGN** 3 credits
Prerequisite: 323. An introduction to the physical, chemical and biological processes utilized in the treatment of water and wastewater, with design parameters emphasized.
- 527 WATER QUALITY MODELING AND MANAGEMENT** 3 credits
Prerequisite: 323. Analysis and simulation of the physical, chemical and biochemical processes affecting stream quality. Development of management strategies based upon the application of water quality modeling techniques to environmental systems.
- 528 HAZARDOUS AND SOLID WASTES** 3 credits
Prerequisite: senior standing or permission of instructor. Hazardous and solid waste quantities, properties and sources are presented. Handling, processing, storage and disposal methods are discussed with non-technical constraints outlined.
- 543 APPLIED HYDRAULICS** 3 credits
Prerequisite: 341. Review of design principles: urban hydraulics, steam channel mechanics, sedimentation, coastal engineering.
- 551 MATRIX ANALYSIS OF STRUCTURES** 3 credits
Prerequisite: 306 or equivalent. Review of matrix algebra, structural analysis concepts. Stiffness formulation of bars, beams, frames. Solution of linear algebraic equations. Computer program implementation, application.
- 553 OPTIMUM STRUCTURAL DESIGN** 3 credits
Prerequisite: 306. Basic concepts in structural optimization. Mathematical programming methods including unconstrained minimization, multidimensional minimization and constrained minimization.
- 554 ADVANCED MECHANICS OF MATERIALS** 3 credits
Prerequisite: 202 or equivalent. Three-dimensional state of stress and strain analysis. Unsymmetric bending of straight and curved members with shear deformation. Beams on elastic foundations. Saint Venant's torsional problems. Inelastic analysis of bending and torsional members. Introduction to energy method. Instability behavior of prismatic members.
- 563 TRANSPORTATION PLANNING** 3 credits
Prerequisite: 361. Theory and techniques for development, analysis and evaluation of transportation system plans. Emphasis on understanding and using tools and professional methods available to solve transportation planning problems, especially in urban areas.
- 564 HIGHWAY DESIGN** 3 credits
Prerequisite: 361. Study of modern design of geometrical and pavement features of highways. Design problem and computer use. Graduate students will produce a more complete design.
- 565 PAVEMENT ENGINEERING** 3 credits
Prerequisite: 361. Theories of elasticity, of viscoelasticity and of layered systems as applied to pavements. Pavement materials characterization; pavement design, pavement restoration for rigid and flexible pavements.

- 566 TRAFFIC ENGINEERING** 3 credits
Prerequisite: 361. Vehicle and urban travel characteristics, traffic flow theory, traffic studies, accidents and safety, traffic signs and marking, traffic signal planning, traffic control and transportation administration.
- 568 HIGHWAY MATERIALS** 3 credits
Prerequisites: 361, 380 or permission. Properties of aggregates, manufacture and properties of portland cement concrete, properties of asphaltic materials, design and testing of hot mix asphalt pavement mixes and of surface treatments. Laboratory preparation of specimens and determination of properties. Graduate student requirement: Graduate students will be required to perform an additional eight-hour asphalt laboratory (Absorption recovery of asphalt from solution) and to prepare a paper on a highway materials topic.
- 574 UNDERGROUND CONSTRUCTION** 2 credits
Prerequisite: 314. Description of practices and techniques of underground construction. Selection of proper method for individual job. Design of underground openings, support systems and linings.
- 604 DYNAMICS OF STRUCTURES** 3 credits
Prerequisite: 306. Approximate, rigorous dynamic analysis of one, two, multiple and infinite degrees of freedom structural systems. Elastoplastic, plastic analysis. Equivalent systems, dynamic hinge concept. Modal analysis. Transfer matrices. Fourier, Laplace transforms.
- 605 STRUCTURAL STABILITY** 3 credits
Prerequisite: 554 or equivalent. Buckling of bars, beam-columns and frames. Lateral buckling of beams. Double and tangent modulus theories. Energy methods. Compressed rings and curved bars. Torsional buckling. Buckling of plates and shells. Inelastic buckling.
- 606 ENERGY METHODS AND ELASTICITY** 3 credits
Prerequisite: 202. Work and complementary work. Strain energy and complementary strain energy. Virtual work and Castigliano's theorems. Variational methods. Applications. Formulation of boundary value problems in elasticity. Selected topics in energy methods and elasticity.
- 607 PRESTRESSED CONCRETE** 3 credits
Prerequisite: 404. Basic concepts. Design of double-tee roof girder; shear; development length; column; piles; design of highway bridge girder; pretensioned, post-tensioned; continuous girders; corbels; volume-change forces; connections.
- 606 MULTISTORY BUILDING DESIGN** 3 credits
Prerequisite: 401. Floor systems; staggered truss system; braced frame design; unbraced frame design; drift indices; monoque (tube and partial tube) systems; earthquake design; fire protection. Analysis by STRUDL.
- 609 FINITE ELEMENT ANALYSIS I** 3 credits
Prerequisite: 554 or equivalent. Introductory development of finite element method as applied to various topics from continuum mechanics. Such areas as plane, axisymmetric and 3-D stress analysis; conduction, fluid mechanics; transient problems and geometric and material nonlinearity.
- 610 INTRODUCTION TO COMPOSITE MECHANICS** 3 credits
Prerequisite: 554 or equivalent. Fundamental concepts of composites, composite micro-mechanics, macromechanics and laminate theory discussed from geometric relationships to laminate analysis for stiffness and strength. The geometric, mechanical, hygral and thermal behavior or composites described in terms of corresponding properties of the constituents. Emphasis placed on the physics of composite behavior; design and analysis of fiber composite laminates subjected to mechanical and environmental loading conditions.
- 611 FUNDAMENTALS OF SOIL BEHAVIOR** 2 credits
Prerequisite: 314. In-depth examination of structure and fundamental physico-chemical and mechanical properties of engineering soils viewed as particulate matter.
- 612 ADVANCED SOIL MECHANICS** 3 credits
Prerequisite: 314. Study of mechanics of behavior of soil as continuum. Principles of stress, strain, deformation, shear strength and pore water pressure as applied to mechanical behavior of soil masses.
- 613 ADVANCED GEOTECHNICAL TESTING** 3 credits
Prerequisites: 518, 612. Theory and practice of static and dynamic in situ and laboratory soil testing. Testing procedures, applicability, limitations. General evaluation of geotechnical parameters for routine and special site conditions. One lecture, two laboratories per week.
- 614 FOUNDATION ENGINEERING I** 3 credits
Prerequisite: 313 or permission. Foundation bearing capacity and settlement analysis. Design of shallow and deep foundation systems. Pile driving and load test procedures and analysis. Theory and design of earth-retaining structures including retaining walls, tiebacks and bulkheads.
- 615 FOUNDATION ENGINEERING II** 3 credits
Prerequisite: 614 or permission. Soil-structure interaction theory and applications to underground structures including conduits, tunnels and shafts. Advanced foundation construction methods and problems including dewatering, soil stabilization, underpinning and cofferdams. Slope stability analysis.
- 618 ROCK MECHANICS** 3 credits
Prerequisite: 554 or permission. Mechanical nature of rocks; linear elasticity and application to rock problems; inelastic behavior of rocks, time dependence and effects of pore pressure; experimental characterization of rock properties; failure theory and crack propagation.
- 620 SANITARY ENGINEERING PROBLEMS** 2 credits
Prerequisite: 323. Application of both laboratory methods and theory to solution of sanitary engineering problems involving water pollution, stream regeneration, special industrial wastes, detergents and others.
- 621 WATER AND WASTEWATER LABORATORY** 2 credits
Prerequisite: 426 or permission of instructor. Conduction of laboratory experiments related to the design and operation of water and wastewater treatment processes. Experimental design, data collection, analysis and report preparation.
- 622 WATER TREATMENT PLANT DESIGN** 3 credits
Prerequisite: permission. Design of water treatment plants for potable, industrial and commercial uses. Development of water sources, treatment methods and financing used to design best practical methods in terms of cost-benefits.
- 623 WASTEWATER TREATMENT PLANT DESIGN** 3 credits
Prerequisite: permission. Application of theory and fundamentals to design of wastewater treatment plants. System design methods used for biological and chemical stabilization of wastewater to meet water quality criteria. Economic analyses made to determine best practical designs to be utilized.
- 624 ENGINEERING MANAGEMENT OF WATER UTILITIES** 2 credits
Prerequisite: permission. Comprehensive study of various functions of water utility and engineering management operations pertaining to intricate and complex processes. Fundamentals of responsibility and duties applicable to water utility systems.
- 625 WATER AND WASTEWATER PROCESSES I** 3 credits
Prerequisite: 423. Theory, current research associated with physical/chemical processes, the impact on design-coagulation/flocculation, sedimentation, filtration, absorption processes emphasized.
- 626 WATER AND WASTEWATER PROCESSES II** 3 credits
Prerequisite: 423. Theory, current research associated with biological processes, related physical/chemical processes, the impact on design-activated sludge, fixed film processes, gas transfer, sludge stabilization, sludge dewatering processes emphasized.
- 627 WATER POLLUTION PRINCIPLES** 4 credits
Prerequisite: 323 or permission. Principles of water chemistry, microbiology, and chemical reaction engineering as applied to understanding and solving environmental problems.
- 640 ADVANCED FLUID MECHANICS** 3 credits
Prerequisite: 4600:310 or permission. Basic equations, Navier-Stokes equations. Analysis of potential flow, turbulence, hydraulic transients. Solution of typical fluid mechanics problems. Analysis of water hammer in pipe networks by method of characteristics.
- 644 OPEN CHANNEL HYDRAULICS** 3 credits
Application of basic principles of fluid mechanics to flow in open channels. Criteria for analysis of uniform, gradually varied and rapidly varied flows. Study of movement and transportation of sediments. Design problems utilizing numerical techniques.
- 645 APPLIED HYDROLOGY** 3 credits
Discussion of water cycle such as precipitation, evaporation, stream flows, floods, infiltration. Methods of analysis and their application to studies of water demand, storage, transportation including mathematical modeling of urban runoff and statistical hydrology.
- 646 COASTAL ENGINEERING** 3 credits
Characteristics of linear and nonlinear wave theories. Interaction of structures, waves; design analysis of shore, offshore structures. Movement, transportation of sediments in lake shore areas.
- 681 ADVANCED ENGINEERING MATERIALS** 3 credits
Selected topics on principles governing mechanical behavior of materials with respect to elastic, plastic and creep responses, stress rupture, low and high cycle and thermal fatigue. Failure theories and fracture phenomena in brittle and ductile materials. Crack propagation and life prediction of engineering materials.
- 682 ELASTICITY** 3 credits
Prerequisite: 202. Plane stress, plane strain. Two-dimensional problems in rectangular, polar coordinates. Strain-energy methods. Stress, strain in three dimensions. Torsion. Bending. Thermal stresses.
- 683 PLASTICITY** 3 credits
Prerequisite: 682, 4600:622 or equivalent. Mathematical formulation of constitutive equations with focus on their use in structural analysis. Internal variables. Isotropic, kinematic hardening. Nonisothermal plasticity. Finite deformations. Anisotropy.
- 684 ADVANCED REINFORCED CONCRETE DESIGN** 3 credits
Prerequisite: 403. Slab systems. Equivalent frame properties. Limit analysis. Yield line theory. Lateral load systems. Shear walls. Footings. Biaxial column action.
- 685 ADVANCED STEEL DESIGN** 3 credits
Prerequisite: 401. Properties of steel, fasteners, bearing, friction joints, Gusset plates, bolts in tension, end plates, weld joints, cyclic loads, fatigue analysis, types of detail, torsion, stability design.
- 686 EXPERIMENTAL METHODS IN STRUCTURAL MECHANICS** 3 credits
Prerequisite: 682. Electrohydraulic closed-loop test systems. Methods for specimen heating. Strain measurement techniques for room and elevated temperatures. Design of computer controlled experiments investigating deformation and failure under complex stress states.
- 687 LIMIT ANALYSIS IN STRUCTURAL ENGINEERING** 3 credits
Prerequisites: 454/554, 682. Fundamental theorems of limit analysis. The lower-bound and upper-bound solutions. Applications to frames, plates and plane stress and plane strain problems. Design considerations. Mathematical programming and computer implementation.
- 694 ADVANCED SEMINAR IN CIVIL ENGINEERING** 1-3 credits
Prerequisite: permission. Advanced projects, reading, studies, or experimental in various areas of civil engineering.
- 697 MASTER'S RESEARCH** 1-9 credits
Prerequisite: permission. Research on some suitable topic in civil engineering as approved by the department. Graded as credit/noncredit and can be repeated. Credit cannot be applied towards master's degree.
- 698 SPECIAL PROBLEMS** 1-4 credits
Prerequisite: permission. (May be repeated for a total of four credits). Supervised research in student's major field. Topic selected by student subject to approval by adviser and graduate committee. Individual research should lead to a final report which will be graded by the adviser and graduate committee.
- 699 MASTER'S THESIS** 1-6 credits
Prerequisite: permission. Research and thesis on some suitable topic in civil engineering as approved by department. Defense of thesis is by final examination.
- 701 EARTHQUAKE ENGINEERING** 3 credits
Prerequisite: 604. Earthquake fundamentals. Earthquake response of single-story and multi-story buildings, as well as structural components. Modal analysis for earthquake response. Inelastic response of multistory structures. Earthquake codes. Stochastic approach.
- 702 PLATES AND SHELLS** 3 credits
Prerequisites: 682 and 3450:531. Navier and Levy solutions for rectangular plates. Approximate methods, including finite differences. Forces in middle plane. Large deflections. Differential geometry of a surface. Shells of revolution.
- 703 VISCOELASTICITY AND VISCOPLASTICITY** 3 credits
Prerequisite: 683. Formulation of constitutive relations for time dependent materials. Classical linear viscoelasticity. Internal variable representation of nonlinear, hereditary behavior. Creep and rate dependent plasticity. Continuum thermodynamics. Anisotropy.
- 704 FINITE ELEMENT ANALYSIS II** 3 credits
Prerequisites: 609 and 702 or permission. Curved, plate, shell brick elements. Quasi-analytical elements. Quadrature formulas. Substructuring for static and dynamic analyses. Solution algorithms for linear and nonlinear static and dynamic analysis. Computer program formulation. Review of large-scale production programs.
- 710 ADVANCED COMPOSITE MECHANICS** 3 credits
Prerequisite: 610. Analysis of short-fiber composites and statistical behavior, bending, buckling and vibration of laminated plates and shells. Advanced topics involving stress concentration, residue stress, fatigue, fracture toughness, nonlinear and viscoelastic stress-strain formulations, solutions of nonlinear problems.

- 712 DYNAMIC PLASTICITY** 3 credits
Prerequisite: 683 or 703. Impulsive and transient loading of structures and structural elements (beams, plates, shells, etc.) in which inelastic deformation occurs. Topics include: longitudinal and transverse plastic wave propagation in thin rods, propagation of plastic hinges, rate-dependent viscoplastic waves, transverse impact on beams and plates, high-rate forming, blast loading, plate perforation, shock waves in solids.
- 717 SOIL DYNAMICS** 3 credits
Prerequisite: 614 or permission. Vibration and wave propagation theory relating to soils, soil structures and foundations. Dynamic behavior of soils. Design of foundations for dynamic loading impact, pulsating and blast loads.
- 745 SEEPAGE** 2 credits
Discussion of parameters determining permeability of various soils. Analytical, numerical and experimental methods to determine two- or three-dimensional movement of groundwater. Unsteady flows.
- 898 PRELIMINARY RESEARCH** 1-15 credits
(May be repeated for a total of 15 credits.) Prerequisite: approval of dissertation director. Preliminary investigations prior to the submission of a dissertation proposal to the Interdisciplinary Doctoral Committee.
- 899 DOCTORAL DISSERTATION** 1-15 credits
(May be taken more than once.) Prerequisite: acceptance of research proposal by the Interdisciplinary Doctoral Committee and approval of the dissertation director. Original research by the doctoral student.

ELECTRICAL ENGINEERING 4400:

- 521 ENGINEERING ECONOMY** 2-3 credits
Prerequisites: 3250/244 and senior standing in engineering. Presents engineering economics as distinguished from classical economic theory.
- 549 DIGITAL COMMUNICATION** 3 credits
Prerequisite: 445. Introduction to digital communication theory and systems; coding of analog and digital information; digital modulation techniques. Introduction to information theory.
- 553 ANTENNA** 3 credits
Prerequisites: 353 or equivalent. Transmitting and receiving antenna parameters, reciprocity theorem, mutual coupling, method of images. Theory of antenna arrays. Various forms of wire and aperture antennas.
- 555 MICROWAVES** 4 credits
Prerequisites: 353, 359. Dynamic fields, Maxwell's equation and wave equations. Field analysis of wave guides, microwave components, techniques and systems.
- 565 COMPUTER CIRCUITS** 4 credits
Prerequisite: 363. Electronic circuitry considerations in logic circuits; methods of sequential, threshold logic analysis, synthesis; development of computer arithmetic elements; memory, storage devices.
- 572 CONTROL SYSTEMS II** 4 credits
Prerequisite: 371. State variable analysis, design of control systems. Discrete systems, analysis, digital computer control. Experiments include hybrid, AC control system, digital computer control.
- 580 SYMMETRICAL COMPONENTS** 3 credits
Prerequisite: 381. Per unit method as applied to power system calculations. Fundamental principles of symmetrical components as applied to analysis of electrical circuits and machines.
- 583 POWER ELECTRONICS I** 3 credits
Prerequisite: 381. Elements of power electronics circuits. Rectifiers, converters, inverters analysis and design.
- 584 POWER ELECTRONICS LABORATORY AND DESIGN PROJECT** 2 credits
Prerequisite: 483/583 or equivalent. Experiments on different types of power electronic converters: AC/DC, DC/DC, DC/AC, and AC/AC. Design project to include design, simulation, building, and testing of a power electronic circuit.
- 585 ELECTRIC MOTOR DRIVES** 3 credits
Prerequisite: 381. Application of electric machines, choice of motor for particular drive. Application of power semiconductor circuits in electric machinery.
- 596 TOPICS IN ELECTRICAL ENGINEERING** 1-2 credits
(May be taken more than once) Prerequisite: permission of department head. Special topics in electrical engineering.
- 600 ADVANCED MICROCOMPUTER SYSTEMS** 3 credits
Prerequisite: 365 or permission. Discussion of multiprocessing, numerical data processors, multitasking, system bus architectures, 16-bit and 32-bit microprocessor architectures, 16-bit and 32-bit microprocessor architectures, multilevel protection and virtual memory, as supported by commercial microprocessor.
- 631 CIRCUIT ANALYSIS** 3 credits
Prerequisite: graduate standing. Operational methods, time domain analysis, state variable methods and matrix techniques applied in circuit analysis. Realizability and synthesis of driving point impedance and transfer functions.
- 641 RANDOM SIGNAL ANALYSIS** 3 credits
Prerequisite: 447. Analysis, interpretation and smoothing of engineering data through application of statistical and probability methods.
- 643 INFORMATION THEORY AND CODING** 3 credits
Prerequisite: 641. Sources, channels, entropy, mutual information, source coding theorem and channel coding theorem; techniques for error control coding, including block, cyclic, and convolutional codes.
- 648 DIGITAL SIGNAL PROCESSING** 3 credits
Prerequisite: 333. Relations between continuous-and discrete-time Fourier expansions. Sampling, aliasing, sampling rate conversion. Operator concepts in signal processing, all-pass systems, FFT, digital filter design.
- 647 DIGITAL SPECTRAL ANALYSIS AND SIGNAL MODELING** 3 credits
Prerequisites: 646 or permission of instructor. Methods and theory of spectral analysis and signal modeling are investigated in detail. Applications of theory include speech processing, optimal filtering, biomedical systems, digital communications.
- 648 DETECTION AND ESTIMATION THEORY** 3 credits
Prerequisite: 641. Signal detection, estimation of signal parameters in noise; Bayes, minimax, Neyman-Pearson criteria; nonparametric and robust procedures; Weiner and Kalman filtering.
- 650 ELECTROMAGNETIC THEORY I** 3 credits
Prerequisite: permission of instructor. Electrostatics: uniqueness theorem, boundary-value problems, constructions of Green's functions. Magnetostatics. Electrodynamics: energy and momentum, EM potentials, Stratton-Chu formulation, radiation, dyadic Green's functions.
- 651 ELECTROMAGNETIC THEORY II** 3 credits
Prerequisite: 650 or permission of the course instructor. Scattering; TEM waves; guided wave theory: transmission lines, closed-boundary guides and cavities, modal orthogonality and completeness, Green's function, excitation and coupling, open-boundary waveguides.
- 652 ADVANCED ELECTROMAGNETICS** 3 credits
Prerequisite: 651. Application of Maxwell's equations. Propagation equations and antenna analysis.
- 655 ADVANCED ANTENNA THEORY AND DESIGN** 3 credits
Prerequisite: 453/553 or equivalent. Basic properties and recent advances of microstrip antennas. Analysis and design of reflector antennas. Analysis and synthesis of linear and planar antenna arrays.
- 661 DESIGN OF DIGITAL SYSTEMS** 3 credits
Prerequisite: 465. Applications of logic circuits in modern digital electronic computer and in digital communication systems. Computer organization and control, input-output devices and interface standards, advanced topics in computers.
- 662 TOPICS IN ELECTRONICS** 3 credits
Prerequisite: permission of department head. Discussions of recent advances in electronics.
- 663 VLSI CIRCUITS AND SYSTEMS** 3 credits
Prerequisite: graduate status. An introductory course designed to provide a broad understanding of very-large-scale-integrated (VLSI) systems, circuits, and devices. Topics include design, simulation, layout, fabrication, and test procedures.
- 664 INTEGRATED CIRCUIT DEVICES** 3 credits
Prerequisite: 353, 360, or equivalent. Develops physical and analytical descriptions of solid-state electronic devices leading to equations and models of (Schottky and PN) diodes and (field-effect and bipolar) transistors.
- 671 DISCRETE CONTROL SYSTEMS** 3 credits
Prerequisite: 472/572 or permission. Theory, techniques for analysis, design of discrete control systems. Z-transform technique, stability analysis, frequency response. Optimization. Digital computer control.
- 673 NONLINEAR CONTROL** 3 credits
Corequisite: 674 or instructor permission. Designed to provide students with qualitative insights into nonlinear systems as well as techniques for controlling such systems. Topics include describing functions, Popov and circle criteria, jump resonances, subharmonics, phase plane, conservative systems, Lyapunov theory, bifurcation of attractors, and routes to chaos.
- 674 CONTROL SYSTEM THEORY** 3 credits
Prerequisite: 371 or instructor permission. Advanced modern control theory for linear systems. Controllability, observability, minimal realizations of multivariate systems, stability, state variable feedback, estimation, and an introduction to optimal control.
- 675 SYSTEM SIMULATION** 3 credits
Prerequisite: 472 or permission of the instructor. This course is designed to provide the control engineer with tools necessary to simulate continuous systems on a digital computer. Topics include linear multistep methods, nonlinear methods, stiff systems, optimization, parallel computing and simulations languages.
- 676 RANDOM PROCESS ANALYSIS** 3 credits
Prerequisite: 674. Analysis and design of control systems with stochastically defined input. Introduction to estimation filters.
- 677 OPTIMAL CONTROL I** 3 credits
Prerequisite: 674. Formulation of optimizational problem; application of variational calculus, maximum principle and optimality principle to control problems. Computational techniques in optimization.
- 680 DYNAMICS AND CONTROL OF POWER ELECTRONIC CIRCUITS** 3 credits
Prerequisites: 483/583 or equivalent. Averaged and sampled-data models for rectifiers and DC/DC converters. Small- and large-signal models about the cyclic steady-state. Feedback controls using classical and modern approaches.
- 681 POWER SYSTEM ANALYSIS** 3 credits
Prerequisite: 480. Short circuit and load flow analysis of power systems with emphasis on computer solution. Transient machine analysis.
- 682 POWER SYSTEM STABILITY** 3 credits
Prerequisite: 681. Steady state and transient stability of power systems with emphasis on computer solution.
- 683 ECONOMICS OF POWER SYSTEMS** 3 credits
Prerequisite: 681. Analysis and operation of power system for economic dispatching using a computer.
- 684 PROTECTIVE RELAYING** 3 credits
Prerequisite: 480. Principles and application of relays as applied to protection of power systems.
- 685 SURGE PROTECTION** 3 credits
Prerequisite: 480. Phenomena of lightning and switching surges on electrical systems. Protection of systems and apparatus by line design, application of protective devices and insulation coordination.
- 686 DYNAMICS OF ELECTRIC MACHINES** 3 credits
Prerequisites: graduate status in Electrical Engineering. Voltage and mechanical differential equations of electric machines, analytical and numerical methods for solution of a system of machine differential equations.
- 687 POWER ELECTRONICS II** 3 credits
Prerequisites: 483/583 or equivalent. Effects of the nonidealities of the power circuit components, magnetics, base and gate drives, thyristor commutation circuits, heat transfer and thermal issues. Analysis and design of advanced power circuits.
- 688 CONTROL OF ELECTRIC MACHINES** 3 credits
Prerequisites: graduate student in Electrical Engineering. Elements of control circuits for electric drives, techniques for torque/speed control of electric machines.
- 689 POWER SEMICONDUCTOR DEVICES** 3 credits
Prerequisite: graduate status in Electrical Engineering. Structure and physics of power semiconductor devices: diodes, Bipolar junction transistors, MOSFETs, Thyristors, Power MOS-Bipolar devices (IGT, MCT). Emphasis on the issues that characterize these devices from the low power semiconductor devices.
- 693 SPECIAL PROBLEMS** 1-3 credits
(May be taken more than once) Prerequisite: permission of department head. For a qualified graduate student. Supervised research or investigation in major field of training or experience. Credit dependent upon nature and extent of project.

- 699 MASTERS THESIS** 1-6 credits
Prerequisite: permission of department head. Research and thesis on some suitable topic in electrical engineering.
- 749 FUNCTIONAL ANALYTIC METHODS IN SYSTEM THEORY** 3 credits
Prerequisite: permission of instructor. A course providing necessary background in advanced mathematical techniques, primarily for doctoral students in communication or control.
- 753 TOPICS IN ELECTROMAGNETICS** 3 credits
Prerequisite: 651. Introduction to advanced techniques in fields. Topics include application of Green's functions techniques and related boundary value problems.
- 772 MODEL REDUCTION TECHNIQUES FOR CONTROL SYSTEMS** 3 credits
Prerequisite: 674 or permission of the instructor. Classical, modern, and optimal techniques for computing reduced order models of linear, nonlinear, and infinite dimensional systems. Minimal realizations of multi-variable systems are also considered.
- 774 ADVANCED LINEAR CONTROL SYSTEMS** 3 credits
Prerequisite: 674 and a course in Real Analysis or equivalent. Covers topics related to the design of robust control systems. The synthesis of controllers which yield stable closed-loop systems will be considered. The H_∞-optimality criterion for controller design is included. Special emphasis will be given to the robust stabilization problem and the disturbance attenuation problem.
- 775 ROBUST CONTROL** 3 credits
Prerequisite: 674. Input-output and state-space characterizations of robust control systems, and design techniques based on the algebraic Riccati equation. Decentralized and reliable control design methodologies.
- 777 OPTIMAL CONTROL II** 3 credits
Prerequisite: 677. Advanced state-feedback optimal control. Output-feedback issues, including loop transfer recovery, optimal observer design, reduced-order controllers, frequency weighting, and decentralized control.
- 778 ADAPTIVE CONTROL** 3 credits
Prerequisite: 671 or permission of instructor. This course will provide the advanced graduate student with the techniques required for the control of time-varying nonlinear and stochastic systems. Topics include minimum prediction error control, least squares estimation, certainty equivalence adaptive control. Kalman filtering, minimum variance control, LQG control and stochastic adaptive control.
- 779 ADVANCED TOPICS IN CONTROL** 3 credits
Prerequisite: 776. Discussions of recent advances in control systems.
- 794 ADVANCED SEMINAR** 1-3 credits
(May be taken more than once) Prerequisite: permission of department head. Advanced level coverage of specialized topics. For student seeking Ph.D. in engineering.
- 898 PRELIMINARY RESEARCH** 1-15 credits
(May be repeated.) Prerequisite: approval of dissertation director. Preliminary investigations prior to submission of a dissertation proposal to the Interdisciplinary Doctoral Committee.
- 899 DOCTORAL DISSERTATION** 1-15 credits
(May be repeated.) Prerequisite: acceptance of research proposal by the Interdisciplinary Doctoral Committee and approval of the dissertation director. Original research by the doctoral student.

ENGINEERING COMPUTER SCIENCE 4450:

- 520 SOFTWARE ENGINEERING** 3 credits
Prerequisites: 3460.209 and instructor's permission. Software life cycle. Specification, design and implementation of team projects.
- 570 INTEGRATED SYSTEM DESIGN** 3 credits
Prerequisite for 470: 4400.465. Prerequisite for 570: 4400.565. Introduction to computer structures, design methods and development tools for VLSI systems. nMOS devices and fabrication. Processing and control design. Layout methods and tools. Design systems.
- 597 SPECIAL TOPICS: COMPUTER SCIENCE** 1-2 credits
(May be taken more than once) Prerequisite: permission of department head. Special topics in computer engineering.
- 606 COMPUTER ARCHITECTURE** 3 credits
Prerequisite: 4400.363 or equivalent. Historical development of computer architecture. Design methodologies. Processor organization and design of instruction sets. Parallel processing. Control section implementations. Memory organization. System configurations.
- 610 COMPUTER ALGORITHMS I** 3 credits
Prerequisites: 4100.206 and 3450.235. Organization of scientific and engineering problems for computer solutions. Analysis of error and convergence properties of algorithms.
- 611 COMPUTER ALGORITHMS II** 3 credits
Prerequisite: 610 or permission. Data structures and algorithm design for minimum execution time and memory requirements.
- 693 SPECIAL PROBLEMS** 1-3 credits
(May be taken more than once) Prerequisite: permission of department head. For a qualified graduate student. Supervised research or investigation in student's major field. Credit depends upon nature and extent of project.
- 794 ADVANCED SEMINAR** 1-3 credits
(May be taken more than once) Prerequisite: permission of department head. Advanced level coverage of various topics. Intended for student seeking Ph.D. in engineering.

MECHANICAL ENGINEERING 4600:

- 500 THERMAL SYSTEM COMPONENTS** 3 credits
Prerequisites: 301, 310, 315. Performance analysis and design of basic components of thermal energy exchange and conversion systems. Components studied include heat exchangers, pumps, compressors, turbines and expansion engines.
- 510 HEATING AND AIR CONDITIONING** 3 credits
Prerequisites: 301, 315. Thermodynamics of gas mixtures. Design and selection of air conditioning equipment. Control of gas mixtures, heating, cooling and humidity.
- 511 COMPRESSIBLE FLUID MECHANICS** 3 credits
Prerequisites: 301, 310. Subsonic and supersonic flow in nozzles, diffusers and ducts. One-dimensional reactive gas dynamics. Prandtl-Meyer theory. Applications to design and analysis of compressors, turbines and propulsion devices.
- 512 FUNDAMENTALS OF FLIGHT** 3 credits
Prerequisite: 310 or equivalent or permission of instructor. Introduction to basic aerodynamics, airplane performance, stability and control, astronautics and propulsion. Design considerations are emphasized.
- 515 ENERGY CONVERSION** 3 credits
Prerequisites: 301, 315. Topics from fields of internal combustion engines, cycle analysis, modern conversion devices.
- 516 HEAT TRANSFER PROCESSES** 3 credits
Prerequisite: 315. Analysis, design of extended surfaces. Natural convective, combined modes of heat transfer and heat transfer with a change of phase. Heat transfer in magnetohydrodynamic systems.
- 522 EXPERIMENTAL STRESS ANALYSIS I** 3 credits
Prerequisite: 336 or 4300.202. Experimental methods of determining stress or strain: brittle lacquer, strain gages, photoelasticity.
- 530 MACHINE DYNAMICS** 3 credits
Prerequisite: 321. Static and dynamic forces in machines, products of inertia, dynamic equivalence, flywheels. Balancing of rotating, reciprocating, cyclic plane motion. Computer simulation of transient mechanism dynamics, other topics in advanced dynamics.
- 531 FUNDAMENTALS OF MECHANICAL VIBRATIONS** 3 credits
Prerequisites: 203 and 3450.235. Undamped and forced vibrations of systems having one or two degrees of freedom.
- 532 VEHICLE DYNAMICS** 3 credits
Application of dynamic systems analysis techniques to road vehicles. Newtonian and Lagrangian methods. Tire/road interface. Ride characteristics, handling and stability. Digital simulation.
- 540 SYSTEM DYNAMICS AND CONTROL** 4 credits
Prerequisites: 315, 431, or permission. Laplace transforms. Mathematical models of physical systems. Transient response and stability. Error analysis and system accuracy. Root locus methods in design. Frequency analysis and design. Compensation techniques.
- 541 CONTROL SYSTEMS DESIGN** 3 credits
Prerequisites: 315, 431, 340. Methods of feedback control design such as minimized error, root-locus, frequency domain. Compensation techniques. Multivariable and nonlinear design methods and computer-aided control design.
- 542 INDUSTRIAL AUTOMATIC CONTROL** 3 credits
Prerequisite: 440 or equivalent. Operation of basic control mechanisms. Study of mechanical, hydraulic, pneumatic, fluidic control systems, including application areas. Tuning of control devices for optimum performance of system. Case studies on control applications from industry, e.g. boilers, furnaces, process heaters.
- 543 OPTIMIZATION METHODS IN MECHANICAL ENGINEERING** 3 credits
Prerequisite: 360. Development and method of solution of optimization problems in mechanical engineering. The use of dynamic programming and operational research methods for optimization including computer utilization and applications.
- 544 ROBOT DESIGN, CONTROL AND APPLICATION** 3 credits
Prerequisites: 321, 440 or equivalent. Robot design and control. Kinematic transformations, velocities and accelerations, path trajectories and dynamics, control and sensing in robotics. The automated factory with robot applications.
- 550 INTRODUCTION TO COMPUTATIONAL FLUID FLOW AND CONVECTION** 3 credits
Prerequisites: 315, 360, or permission of instructor. Numerical modeling of fluid/thermal systems; numerical solution of the momentum and thermal boundary layer equations; flow simulation using advanced heat transfer/fluid/graphics packages.
- 562 PRESSURE VESSEL DESIGN** 3 credits
Prerequisite: 336 or 4300.202. Introduction to modern pressure vessel technology. Topics include basic structural considerations, materials and their environment and design-construction features.
- 600 GAS DYNAMICS** 3 credits
Prerequisite: 411/511. Derivation of equations for multi-dimensional irrotational flow of a compressible fluid. Method of small perturbations. Method of characteristics. Ideal flow theory. Transonic flow. One dimensional unsteady flow.
- 608 THERMODYNAMICS** 3 credits
Prerequisite: 301 or equivalent. Extension and generalization of basic laws of thermodynamics with application to a variety of physical and biological systems. Introduction to irreversible thermodynamics, the third law and statistical thermodynamics.
- 609 FINITE ELEMENT ANALYSIS I** 3 credits
Prerequisite: 622. Introductory development of finite element method as applied to various topics from continuum mechanics. Areas covered include plane; axisymmetric and 3-D stress analysis; conduction; fluid mechanics; transient problems and geometric and material nonlinearity.
- 610 DYNAMICS OF VISCOUS FLOW I** 3 credits
Prerequisites: 301, 310 or equivalent. Derivation and solution of equations governing laminar viscous flow. Applications include unsteady flows, slow viscous flows, parallel flows, lubrication theory and laminar boundary layers.
- 611 COMPUTATIONAL FLUID MECHANICS** 3 credits
Prerequisite: 610 or permission of instructor. Study of numerical methods in fluids; numerical errors and stability, finite differencing, nonlinear convection terms, Poisson equations, boundary conditions, turbulence, spectral and finite element techniques.
- 615 CONDUCTION HEAT TRANSFER** 3 credits
Prerequisite: 315 or equivalent. Study of one-, two- and three-dimensional heat conduction. Development of analytical techniques for analysis and design.
- 616 CONVECTION HEAT TRANSFER** 3 credits
Prerequisite: 315 or equivalent. Heat transfer from laminar, turbulent external, internal flows. Convective heat transfer at high velocities. Heat transfer to liquid metals; high Prandtl number fluids.
- 617 RADIATION HEAT TRANSFER** 3 credits
Prerequisite: 315 or equivalent. Study of governing radiation laws. Black and real systems, geometric factors, gray enclosures, non-gray systems, gaseous radiation, radiation equipment.

- 618 BOILING HEAT TRANSFER AND TWO-PHASE FLOW** 3 credits
Prerequisites: 301, 315 or equivalent. Current techniques to determine heat transfer and pressure drop in components such as boilers, heat exchangers, and steam generators, with boiling. Boiling mechanism, slip ratio, critical heat flux and instabilities in boiling flow systems.
- 620 EXPERIMENTAL STRESS ANALYSIS II** 2 credits
Prerequisite: 422/522. Dynamic strain gage methods, transducer design, Moire fringe techniques and topics in photoelasticity.
- 621 INTRODUCTION TO TIRE MECHANICS** 3 credits
Prerequisite: permission. Topics include tire as vehicle component, tire traction and wear, laminated structures, tire stress and strains and advanced tire models.
- 622 CONTINUUM MECHANICS** 3 credits
Prerequisite: 336 or permission. Analysis of stress and deformation at a point. Derivation of fundamental field equations of fluid and solid mechanics by applying basic laws of dynamics, conservation of mass and energy. Development of constitutive laws.
- 623 APPLIED STRESS ANALYSIS I** 3 credits
Prerequisite: 622. Continuation of 622 with specific application to solid mechanics. Development of energy theorems due to Reissner, Washizu and generalized Hamilton's principle. Solutions to static and dynamic problems.
- 624 FUNDAMENTAL OF FRACTURE MECHANICS** 3 credits
Prerequisite: 622 or permission of instructor. Methods of stress analysis in elastic media containing holes and cracks. Theories of brittle fracture. Dynamic crack propagation. Fatigue fractures. Finite element approaches to fracture mechanics.
- 625 ANALYSIS OF MECHANICAL COMPONENTS** 3 credits
Prerequisite: 337 or equivalent. Theories of failure and plastic flow. Fatigue, creep analysis and introduction to fracture mechanics.
- 629 NONLINEAR ENGINEERING PROBLEMS** 3 credits
Prerequisite: 622. Study of nonlinear ordinary and partial differential equations governing phenomena of mechanics. Analysis of phase space trajectories, singularities and stability. Development of approximate analytical methods.
- 630 VIBRATIONS OF DISCRETE SYSTEMS** 3 credits
Prerequisite: 431/531 or equivalent. Study of vibrations of multidegree of freedom systems including free and forced vibrations, damped and transient response, normal mode vibrations and matrix iteration techniques. Application to seismic design and shock design.
- 631 KINEMATIC DESIGN** 3 credits
Prerequisites: 321 and permission of instructor. The geometry of constrained motion. Analysis of relative plane motion using vectors and the digital computer. Curvature theory. Synthesis of linkages and gearing. Introduction to computer-aided design.
- 632 RELIABILITY IN DESIGN** 3 credits
Prerequisites: 337 or equivalent and 3470.461/561. The reliability determination of mechanical components and systems and its use in design. Distribution, reliability determination, normal and log-normal theories, Weibull theory, life spectrum analysis, renewal theory and confidence limits.
- 633 COMPUTERIZED MODAL ANALYSIS OF STRUCTURES** 3 credits
Prerequisite: 630 or equivalent. Modal analysis theory and measurement techniques, digital signal processing concepts, structural dynamics theory, modal parameter estimation with "hands-on" experience in the application of modal measurement methods in vibration analysis.
- 634 ADVANCED DYNAMICS OF ROTATING MACHINERY** 3 credits
Prerequisites: 430/530 or equivalent. Dynamic modelling and simulation of complex rotor-bearing systems. Steady state, transient and stability analysis with inertia, gyroscopic, imbalance, rotor-bow, disk-skew and impeller-rub interaction effects.
- 635 STRESS WAVES IN SOLIDS AND FLUIDS** 3 credits
Prerequisite: 531 or equivalent. The wave equation. Propagation of elastic-plastic stress waves through solid media. Transmission, reflection, absorption and diffraction phenomena. Low and high velocity impact. Dynamic fracture. Numerical simulation techniques.
- 642 SYSTEM ANALYSIS AND CONTROL DESIGN** 3 credits
Prerequisite: 440 or equivalent. Uniform methods of modeling and response analysis, control stability and observability, stability theory and analysis of linear and nonlinear engineering processes. Design of feedback controls for optimum performance for multivariable real-time control application.
- 643 DISTRIBUTED PROCESS CONTROL DESIGN AND APPLICATIONS** 3 credits
Prerequisite: 440 or equivalent. Digital and continuous control algorithms. Process control function implementation. Self-learning, diagnostics, intelligent control systems. Case studies and experiments from various engineering disciplines.
- 645 PROCESS IDENTIFICATION AND COMPUTER CONTROL** 3 credits
Prerequisite: 440 or equivalent. Obtaining mathematical models of processes from noisy observations. Methods of digital control design. Case studies on computer control of selected processes.
- 646 EXPERT SYSTEMS IN CONTROLS AND MANUFACTURING** 3 credits
Prerequisite: 440/540 or equivalent or by permission. Expert system methodologies for process control, computer integrated flexible manufacturing and robotics.
- 647 NEURAL AND FUZZY CONTROL SYSTEMS** 3 credits
Prerequisite: 440/540 or permission of instructor. Analysis and design of intelligent control systems. Neural networks and fuzzy sets for process identification and controller design. Applications and case studies in industry.
- 650 TRIBOLOGY** 3 credits
Fundamentals of friction lubrication and wear treated; includes basic theory, advanced topics, applications to bearings, seals, gears, cams. Specific topics include adhesive and abrasive friction/wear, boundary lubrication, fluid film lubrication and bearings, rolling element bearings, bearing dynamics.
- 660 ENGINEERING ANALYSIS** 3 credits
Prerequisite: B.S. in engineering. Study of analysis techniques as applied to specific engineering problems. Applications include beam deflections, acoustics, heat conduction and hydrodynamic stability.
- 663 MEASUREMENTS METHODS AND EXPERIMENTAL ERROR IN THERMOFLUID SCIENCES** 3 credits
Prerequisites: viscous flow, conduction heat transfer, convection heat transfer. The course will incorporate elements of experimental error analysis, optics, and optical ray tracing, principles of testing, methods and devices for fluid flow quantization and temperature measurements. Laboratory work with hands-on experience.
- 667 SPECIAL TOPICS** 1-4 credits
Prerequisite: permission. For qualified candidate for graduate degree. Supervised research in student's major field of training or experience. Credit dependent upon nature and extent of project as determined by adviser and department head.
- 669 MASTER'S THESIS** 1-4 credits
Prerequisite: permission of adviser. Supervised research in a specific area of mechanical engineering.
- 704 FINITE ELEMENT ANALYSIS II** 3 credits
Prerequisites: 609, 4300/702. Curved, plate, shell, brick elements; quasi-analytical elements. Quadrature formulas. Substructuring for static and dynamic analysis. Solution algorithms for linear and nonlinear static and dynamic analysis. Computer program formulation. Review of large-scale production programs.
- 705 FINITE ELEMENT ANALYSIS III** 3 credits
Prerequisite: 704. Static and dynamic contact problems. Tire mechanics. Fracture mechanics. Plasticity problems involving small and large deflections. Shake down analysis. General constitutive models for composite media, thermoviscoelasticity, fluid turbulence. Fluid-solid interaction analysis.
- 710 DYNAMICS OF VISCOUS FLOW II** 3 credits
Prerequisite: 610. Introduction to turbulence. Turbulence modeling and turbulent boundary layers. Practical methods of solution of boundary layer problems. Transition process.
- 711 COMPUTATIONAL FLUID DYNAMICS II** 3 credits
Prerequisite: 611 or permission of instructor. Development of advanced computational techniques for convection-dominated flows. Higher order explicit and implicit schemes including nonoscillatory front-capturing methods applied to benchmark problems.
- 715 HYDRODYNAMIC STABILITY** 3 credits
Prerequisites: 660, 620 or permission. Stability concepts, Stability of Benard convection, Rayleigh-Taylor flow, parallel shear layers, boundary layers, asymptotic solution of Orr-Sommerfeld equation, nonparallel stability.
- 719 ADVANCED HEAT TRANSFER** 3 credits
Prerequisites: 615, 616. Topics include nonhomogeneous or nonlinear boundary value problems of heat conduction, heat transfer with melting, solidification and ablation, heat transfer in porous systems and hydrodynamically and thermally unsteady convection.
- 723 APPLIED STRESS ANALYSIS II** 3 credits
Prerequisite: 623. Continuation of 623. Development of approximate solution techniques including finite elements, method of weighted residuals (Rayleigh-Ritz, Galerkin, Trefftz, collocation, least squares, etc.) and finite differences.
- 726 NONLINEAR CONTINUUM MECHANICS** 3 credits
Prerequisite: 622. Finite deformation and strain, stress, constitutive equations, strain energy functions. Solution of finite deformation problems in hypoelasticity, coupled thermoviscoelasticity and plasticity, electroelasticity and micropolar theories.
- 730 VIBRATIONS OF CONTINUOUS SYSTEMS** 3 credits
Prerequisite: 630. Continuation of 630. Analysis of continuous vibrating systems, using separation of variables, energy, variational, Rayleigh-Ritz and other approximate techniques. Concepts and solutions of integral equations as applied to continuous systems.
- 731 RANDOM VIBRATIONS** 3 credits
Prerequisite: 630 or equivalent. Stationary random processes and their transmission through linear time-invariant discrete and continuous vibrating systems. Analysis of random data and interaction between mechanisms of failure.
- 732 ADVANCED MODAL ANALYSIS OF STRUCTURES** 3 credits
Prerequisite: 633 or equivalent. Structural excitation techniques. Modal parameter estimation. System modification; mass/stiffness/damping matrices substructuring. Prediction and evaluation of structural modified dynamic characteristic.
- 741 OPTIMIZATION THEORY AND APPLICATIONS** 3 credits
Prerequisite: permission. Theory of optimization in engineering systems, development and method of solution optimization problems for physical processes, large systems. Use of dynamic programming, operational research methods for system optimization, control.
- 763 ADVANCED METHODS IN ENGINEERING ANALYSIS** 3 credits
Prerequisite: 3450.235 or equivalent. Applications of finite difference and finite element methods, variational methods, integral methods and similarity transforms to engineering problems in heat transfers, fluid mechanics and vibrations.
- 790 ADVANCED SEMINAR IN MECHANICAL ENGINEERING** 1-4 credits
(May be repeated for a total of nine credits) Prerequisite: permission of department head. Advanced projects and studies in various areas of mechanical engineering. Intended for student seeking Ph.D. in engineering degree.
- 866 PRELIMINARY RESEARCH** 1-15 credits
Prerequisite: approval of dissertation director. Preliminary investigations prior to the submission of a dissertation proposal to the Interdisciplinary Doctoral Committee.
- 869 DOCTORAL DISSERTATION** 1-15 credits
(May be taken more than once) Prerequisite: acceptance of research proposal by the Interdisciplinary Doctoral Committee and approval by the dissertation director. Original research by the doctoral student.

BIOMEDICAL ENGINEERING

4800:

- 601 BIOMEDICAL INSTRUMENTATION I** 4 credits
Prerequisites: 3100.561, 562, and 4400.232 or 4400.320. Clinical instrumentation to measure and display physiologic and anatomic parameters. Basic concepts of instrumentation including design criteria and operational analyses. Practical experience gained through the use of instrumented mammalian models.
- 611 BIOMETRY** 3 credits
Statistics and experimental design topics for the biomedical and biomedical engineering disciplines including: distributions, hypothesis testing and estimation, ANOVA, probit analysis and nonparametrics statistics.
- 620 NEURAL NETWORKS** 3 credits
Examination of highly parallel, distributed architectures for computing that are, to varying degrees, derived from structures observed in biological nervous systems. After an overview of how real neurons operate, the course will examine both classical and modern neural computing architectures. Comparisons will be made with traditional serial machines and applications for which neural networks seem most promising will be examined.

- 621 SENSORY SYSTEMS ANALYSIS** 3 credits
Prerequisite: 4400:371 or equivalent, or by permission. Study of various sensory modalities from a systems engineering perspective. Techniques from linear and nonlinear systems analysis are applied to aspects of vision, hearing, touch, and position sensing in humans. Comparisons are made with artificial emulations of these senses.
- 630 BIOMEDICAL COMPUTING** 3 credits
Prerequisite: 4100:206 or equivalent. Computer applications in health care, clinical laboratories, AMHT, medical records, direct order entry, A-D, D-A conversion, patient monitoring, peripherals and interfaces, diagnostic algorithms, automated EEG, ECG systems.
- 632 PROCESSING OF BIOMEDICAL SIGNALS** 3 credits
Prerequisites: graduate standing in the College of Engineering and 611 or equivalent. Concepts for the analysis of biological continuous signals and point processes including discriminant and principal component analysis, histograms, correlograms and data displays.
- 634 MEDICAL IMAGING DEVICES** 3 credits
Imaging modalities including radiation, magnetic resonance, and sound. The formation of images. Specific devices including computer tomography, magnetic resonance, ultrasound, gamma cameras and PET.
- 635 PHYSIOLOGICAL CONTROL SYSTEMS** 3 credits
Prerequisite: 4400:371 or equivalent, or by permission. Analyses of motor, circulator, homeostatic, and other physiological functions are carried out from the perspective of control theory, both linear and nonlinear. Both similarities to and differences from traditional engineering systems will be presented. Computer simulations of several physiological systems will be developed.
- 638 IMAGE PROCESSING FOR BIOMEDICAL DATA** 3 credits
Image sampling, quantization, and transforms. Enhancements including smoothing and sharpening. Restoration using inverse and Wiener filters. Edge detection and thresholding with region growing for segmentation.
- 640 SPINE MECHANICS** 3 credits
Prerequisites: 3100:561 or equivalent; 4300:406 or equivalent; or permission. Physical properties and functional biomechanics of the spine. Kinematics and kinetics of the human spine. Biomechanics of scoliosis, trauma, instability, pain, and orthoses. Mechanics and design of surgical implants.
- 641 SOFT CONNECTIVE TISSUE BIOMECHANICS** 3 credits
Prerequisites: 3100:561 or equivalent; 4300:407 or equivalent; or permission. Physical properties and functional biomechanics of ligament, tendon, joint-capsule insertions, myotendinous junction, articular cartilage and meniscus. The mechanics of injury, repair, and replacement for accelerated repair and improved function.
- 642 HARD CONNECTIVE TISSUE BIOMECHANICS** 3 credits
Prerequisites: 3100:561 or equivalent; 4300:407 or equivalent; or permission. Physical properties and functional biomechanics of bone. The biology and mechanics of fractures and fracture healing. Mechanics of external and internal fixators. Total joint implants and reconstruction techniques.
- 645 MECHANICS IN PHYSIOLOGY AND MEDICINE** 3 credits
Prerequisites: 4600:310 and 4300:202 or equivalent. Blood rheology, mechanics of microcirculation, finite deformation theory, soft tissue mechanics, mechanics of blood and lymph circulation, kinetics and kinematics of orthopedic joints. Clinical applications.
- 650 CARDIOVASCULAR DYNAMICS** 3 credits
Prerequisites: 3100:561, 562, or equivalent; 4600:310 or equivalent. Analysis of blood pumping action, pressure/flow waveform transmission and blood rheology factors. Use of modeling and direct measurement techniques. Clinical implications of disease.
- 651 CARDIOVASCULAR DIAGNOSTIC AND THERAPEUTIC TECHNIQUES** 3 credits
Prerequisites: 3100:561, 2 or equivalent. Cardiovascular disease conditions, instrumentation and techniques for diagnosis and surgical procedures, and services for treatment. Direct interaction with active clinical laboratories.
- 652 EXPERIMENTAL METHODS IN BIOMECHANICS** 3 credits
Prerequisite: graduate standing in the College of Engineering or permission. Principles of testing and measuring devices commonly used for biofluid and biosolid mechanics studies. Laboratories for demonstration and hands-on experience.
- 653 TRANSPORT PHENOMENA IN BIOLOGY AND MEDICINE** 3 credits
Prerequisites: 4200:321, 322 or 4600:310, 315 or equivalent. Basic definitions, cardiovascular mass and momentum transport, compartment modeling, mass transfer in physiological systems and artificial kidney and lung devices, Design optimization. Analysis of human thermal system.
- 660 BIOMATERIALS AND LABORATORY** 4 credits
Prerequisite: Biomaterials Laboratory. Material uses in biological applications. Effect of physiological environment and sterilization on materials. Controlled and uncontrolled degradation. Effect of materials on soft tissue, hard tissue and blood. Laboratory experiments using materials designed for biomedical use and demonstrations of biological/materials interactions.
- 663 ARTIFICIAL ORGANS** 3 credits
Prerequisites: graduate standing in the College of Engineering or permission of instructor. Study of the rationale for the engineering and clinical aspects required for the design and variety of artificial organs, with emphasis on the artificial heart and artificial kidney.
- 697 SPECIAL TOPICS** 1-4 credits
(May be repeated) Prerequisite: permission of instructor. Current topics or supervised study in the area of biomedical engineering. Credit hours depend upon the nature and extent of the course or the project.
- 699 MASTER'S THESIS** 1-6 credits
Prerequisite: permission of adviser. Supervised research in the specific area of biomedical engineering.
- 896 PRELIMINARY RESEARCH** 1-15 credits
(May be repeated) Prerequisite: approval of the dissertation director. Preliminary investigations prior to the submission of a dissertation proposal to the Interdisciplinary Doctoral Committee.
- 899 DOCTORAL DISSERTATION** 1-15 credits
Prerequisite: acceptance of research proposal by the Interdisciplinary Doctoral Committee and approval of the dissertation director. Original research by the doctoral student.

College of Education

EDUCATIONAL FOUNDATIONS

5100:

- 512 DESIGN AND PRODUCTION OF INSTRUCTIONAL MATERIALS** 3 credits (20 clinical hours)
Covers design, adaptation and preparation and media materials. Student produces media materials including overhead projection transparencies, audio recordings, slide sequences and opaque materials. The student is offered project choices.
- 514 ORGANIZING AND SUPERVISING EDUCATIONAL MEDIA PROGRAMS** 3 credits
Prerequisite: 310 or permission of the instructor. Procedures for planning, organizing and evaluating educational media programs including media facilities and services.
- 520 INTRODUCTION TO COMPUTER-BASED EDUCATION** 3 credits
Prerequisite: graduate or senior standing. Techniques for developing, implementing and evaluating computer-based education. Participants will work with instructional paradigms and instructional computing languages. Both the hardware and software considerations associated with current applications examined.
- 590,1,2 WORKSHOP** 1-3 credits each
Individual work under staff guidance on curriculum problems, utilization of community resources, planning of curriculum units.
- 594 EDUCATIONAL INSTITUTES** 1-4 credits
Special course designed as in-service upgrading programs.
- 600 PHILOSOPHIES OF EDUCATION** 3 credits
Examination of basic philosophical problems underlying broad educational questions that confront society. Provides foundation for understanding of questions of modern society and education.
- 602 COMPARATIVE AND INTERNATIONAL EDUCATION** 3 credits
Comparative study of selected national school systems with reference to forces that shape their characteristics. Different theoretical approaches used in study of comparative education also investigated.
- 604 TOPICAL SEMINAR IN THE CULTURAL FOUNDATIONS OF EDUCATION** 3 credits
(May be repeated for a total of six credits) Issues and subjects related to study of educational institutions, theories and/or ideas. Different topics will be offered from section to section.
- 616 ADULT EDUCATION** 2 credits
Survey course for teachers and administrators. Historical background including influences and their relation to developments in the field. Emphasis on background and social value of current programs.
- 620 BEHAVIORAL BASES OF EDUCATION** 3 credits
Prerequisite: 250 or equivalent. Introduction to scientific study of learning and development. Student required to study current theories, research in areas of learning, development, motivation, instruction.
- 624 SEMINAR: EDUCATIONAL PSYCHOLOGY** 3 credits
(May be repeated for a total of six credits) Prerequisite: 250 or equivalent. In-depth study of research in selected areas of learning, development, evaluation and motivation.
- 630 TOPICAL SEMINAR IN COMPUTER-BASED EDUCATION** 3 credits
(May be repeated for a total of six credits) Prerequisite: 420/520. Advanced topics related to development, implementation, research and evaluation in C.B.E. Student involvement emphasized, required. Knowledge of programming language recommended.
- 636 SEMINAR: EDUCATIONAL TECHNOLOGY** 3 credits
Practices and trends in educational communications and technology including centers, learning stations, programmed learning, educational television and computer-assisted instruction. Special topics in educational communications and technology.
- 640 TECHNIQUES OF RESEARCH** 3 credits
Research methods and techniques commonly used in education and behavioral sciences; preparation of research reports. Includes library, historical, survey and experimental research and data analysis.
- 642 TOPICAL SEMINAR IN MEASUREMENT AND EVALUATION** 3 credits
(May be repeated for a total of six credits) Topics of current interest and need will be emphasized. The student will develop extended competence with contemporary measurement and evaluation techniques.
- 695 FIELD EXPERIENCE: MASTER'S** 1-3 credits
Prerequisites: permission of department head and instructor. Area determined in accordance with student's program and professional goals.
- 697 INDEPENDENT STUDY** 1-3 credits
(May be repeated for a total of six credits) Prerequisites: permission of department head and instructor. Specific area of study determined in accordance with student's program and professional goals.
- 696 MASTER'S PROBLEM** 2-4 credits
Prerequisite: permission of adviser. In-depth study of a research problem in education. Student must be able to demonstrate critical and analytical skills in dealing with problems in educational foundations.
- 699 THESIS RESEARCH** 4-6 credits
Prerequisites: permission of department head and instructor. In-depth study of research problem within humanistic and behavior foundation.
- 701 HISTORY OF EDUCATION IN AMERICAN SOCIETY** 3 credits
Historical development of education in American social order, with special emphasis on social, political and economic setting.

- 703 SEMINAR: HISTORY AND PHILOSOPHY OF HIGHER EDUCATION** 3 credits
Prerequisite: 600 or equivalent. History and philosophy related to genesis and development of higher education in the Western world, with special emphasis given to higher education's development in United States.
- 705 SEMINAR: SOCIAL-PHILOSOPHICAL FOUNDATIONS OF EDUCATION** 3 credits
(May be repeated for a total of six credits) Prerequisite: 600 or equivalent. Inquiry into selected ideological, social, economic and philosophical factors affecting educational development in United States and other countries.
- 721 LEARNING PROCESSES** 3 credits
Study of principles underlying classroom learning processes with particular emphasis on teaching as means of modifying pupil behavior; cognitive, motor, social and affective.
- 723 TEACHER BEHAVIOR AND INSTRUCTION** 3 credits
Prerequisite: 600. Intensive survey of theoretical and empirical literature involving teacher and conceptions of instruction. A student reports on theory, empirical research and applications in areas of individual interests.
- 741 STATISTICS IN EDUCATION** 3 credits
Statistical methods and techniques used in educational measurement and in educational research. Emphasis on hypothesis testing.
- 743 ADVANCED EDUCATIONAL STATISTICS** 3 credits
Prerequisite: 741. A second course on quantification in behavioral sciences. Includes testing of statistical hypotheses, experimental design, analysis of variance and nonvariance, factor analysis and introduction to nonparametric statistics.
- 798 RESEARCH PROJECT IN SPECIAL AREAS** 1-3 credits
Prerequisites: permission of department head and instructor. Critical and in-depth study of specific problem in educational foundations.
- 801 RESEARCH SEMINAR** 3 credits
(May be repeated for a total of six credits) Prerequisites: 640 and 741; permission of department head and instructor. Intensive study of research methods applicable to education. Emphasis on developing a dissertation proposal.
- 897 INDEPENDENT STUDY** 1-4 credits
(May be repeated for a total of eight credits) Prerequisites: permission of department head and instructor. Specific area of inquiry within humanistic and behavioral foundations of education determined in advance by student and faculty adviser.

ELEMENTARY EDUCATION

5200:

- 511 CREATIVE TECHNIQUES FOR EXPLORING CHILDREN'S LITERATURE** 2 credits
Prerequisite: 286. Examination of techniques for interpretation of children's literature including storytelling, creative dramatics, reader's theatre and choral speaking.
- 535 ACTIVITIES TO INDIVIDUALIZE SOCIAL STUDIES** 2 credits
Prerequisite: 338. Development of materials and activities (learning games, simulation games, simulations, learning stations, programmed field trips and map activities) to provide teacher with variety of techniques in order to develop an individualized, student-involved social studies program.
- 536 GEOMETRY AND MEASUREMENT IN ELEMENTARY SCHOOL MATHEMATICS** 3 credits
Prerequisite: 336. Trends in geometry and measurement instruction in elementary school. Procedures for development of important geometric concepts and measurement skills.
- 537 STRUCTURE OF THE NUMBER SYSTEM IN ELEMENTARY SCHOOL MATHEMATICS** 3 credits
Prerequisite: 336. Applied and advanced topics in mathematics education in elementary school. Thorough investigation of number system presently being taught in elementary school.
- 538 MATERIALS AND LABORATORY TECHNIQUES IN ELEMENTARY SCHOOL MATHEMATICS** 3 credits
Prerequisite: 336. Applied mathematics. Construction and application of mathematical models. Procedures for development of important mathematical concepts through the laboratory approach.
- 539 PROPERTIES OF NUMBERS IN ELEMENTARY SCHOOL MATHEMATICS** 3 credits
Prerequisite: 336. Investigation of those number properties that help explain how laws of arithmetic work. Procedures for development of important arithmetic concepts and computational skills.
- 540 CONTEMPORARY ELEMENTARY SCHOOL SCIENCE PROGRAMS** 2 credits
Prerequisite: 333. Contemporary elementary science programs critically analyzed and their procedure developed and implemented in University classroom.
- 590,1,2,3 WORKSHOP** 1-3 credits each
Elective workshop for elementary education major who would pursue further refinement of teaching skills. Emphasizes demonstrations of teaching techniques and development of suitable teaching devices.
- 594 EDUCATIONAL INSTITUTES** 1-4 credits
Special courses designed as in-service upgrading programs. Frequently provided with the support of national foundations.
- 620 LITERATURE FOR YOUNG CHILDREN** 2 credits
Literature for children ages two through six examined in depth in terms of value and purpose; methods and techniques for presenting it to children; variety and quality of books available.
- 630 ELEMENTARY SCHOOL CURRICULUM AND INSTRUCTION** 2 credits
Application of findings of recent research to curriculum building and procedures in teaching.
- 631 TRENDS IN ELEMENTARY EDUCATION** 2 credits
Prerequisites: graduate standing and 630. Investigation of innovative programs, organizational patterns and new curricula currently operational in elementary schools including analysis of use of these innovations in relation to teaching/learning process.
- 640 THEORY AND PRACTICE IN ELEMENTARY SCHOOL MATHEMATICS** 2 credits
Comparative analysis and evaluation of purposes and procedures of mathematics programs for elementary schools with application of findings to instructional methods and materials.

- 641 DIAGNOSIS AND TREATMENT OF PERFORMANCE DIFFICULTIES IN ELEMENTARY SCHOOL MATHEMATICS** 2 credits
Examination of implications of contemporary mathematics learning theory on diagnostic-remedial process.
- 645 PROBLEMS IN ELEMENTARY SCIENCE EDUCATION** 2 credits
Examination of influence of new curricular designs in elementary science. Emphasis on inquiry, investigation and discovery and their impact on total elementary school curriculum.
- 650 EDUCATION AND THE YOUNG CHILD** 2 credits
Content centered on educational settings of young children from birth through five years.
- 666 INDIVIDUALIZED INSTRUCTION: LEARNING STYLE IDENTIFICATION AND RESOURCE PRESCRIPTION** 3 credits
Prerequisites: permission of instructor and 630. Individual learning style characteristics, practical approaches in individualization of instruction, multisensory resource development and prescription.
- 695.6 FIELD EXPERIENCE: MASTER'S** 1-2 credits each
Prerequisites: permission of adviser and department head. On-the-job experience related to student's course of study.
- 697 INDEPENDENT STUDY** 1-3 credits
Prerequisites: permission of adviser and department head. Selected areas of independent investigation as determined by adviser and related to student's academic needs.
- 698 MASTER'S PROBLEM** 2-4 credits
Prerequisite: permission of adviser. In-depth study of a research problem in education. Student must be able to demonstrate critical and analytical skills in dealing with a problem in elementary education.
- 699 THESIS RESEARCH** 4-6 credits
Prerequisites: 5100:640 and permission of adviser and department head. In-depth research investigation. Student must be able to demonstrate necessary competencies to deal with research problems in elementary education.
- 732 SUPERVISION OF INSTRUCTION IN THE ELEMENTARY SCHOOL** 2 credits
Supervisory role of elementary principal and other supervisory personnel.
- 780 SEMINAR IN ELEMENTARY EDUCATION** 2 credits
(May be repeated) Intensive examination of following areas of elementary school instruction: children's literature, curriculum development, language arts, mathematics, reading, science, social studies, early childhood, critical analysis of children's literature, art, human sexuality, computers and middle school.
- 781 RESIDENCY SEMINAR** 2 credits
Two-hour weekly meeting for elementary doctoral student in residence.
- 799 RESEARCH PROJECTS IN ELEMENTARY EDUCATION** 1-2 credits
Prerequisites: permission of adviser and department head. In-depth investigation of specific problem pertinent to elementary education.
- 895.6,7 FIELD EXPERIENCE FOR ELEMENTARY DOCTORAL STUDENT** 1-2 credits each
Prerequisites: permission of adviser and department head. Designed to help student preparing to teach methods course at college level.
- 898 INDEPENDENT STUDY** 1-3 credits
(May be repeated for a total of six credits) Prerequisites: permission of adviser and department head. Selected areas of independent investigation as determined by adviser and related to student's academic needs.
- 899 DISSERTATION** 1-20 credits
Prerequisites: permission of adviser and department head. Study and in-depth analysis of a research problem in elementary education.

READING

5250:

- 511 MATERIALS AND ORGANIZATIONS FOR READING INSTRUCTION** 3 credits
Prerequisite: 5200:339. Professional problems of selection and evaluation of reading materials and classroom organizations explored.
- 540 DEVELOPMENTAL READING IN THE CONTENT AREAS — ELEMENTARY** 3 credits
Prerequisite: 5200:337 or permission of instructor. Nature of reading skills relating to content subjects. Methods and materials needed to promote reading achievement in content subjects by the elementary classroom teacher.
- 541 LANGUAGE AND ITS RELATIONSHIP TO READING IN THE ELEMENTARY SCHOOL** 3 credits
Prerequisite: 5200:337 or permission of the instructor. An overview of the linguistic field in the teaching of reading in the elementary school. A discussion of major linguistic principles for classroom application in grades K-8.
- 542 TEACHING READING TO CULTURALLY DIFFERENT LEARNERS** 3 credits
Prerequisite: 5200:337 or by permission of the instructor. The course is designed to provide a student with knowledge, skills and attitudes which will enable employment of effective methods of teaching reading to culturally different learners, and/or learners whose language patterns are nonstandard.
- 680 TRENDS IN READING INSTRUCTION** 2 credits
Prerequisite: 5200:335 or 5300:425. Survey course designed to update reading background of student who has not had a recent course in reading.
- 681 DIAGNOSIS AND CORRECTION OF READING PROBLEMS** 5 credits
Prerequisite: 680. Relation of growth to reading development and reasons for retardation. Implementation of diagnostic and corrective techniques by developing case studies in supervised setting.
- 682 CLINICAL PRACTICES IN READING** 5 credits
Prerequisite: 681. Nature and etiology of reading difficulties experienced by selected children. Supervised practices and independent work with children in conjunction with staff from other disciplines.
- 683 READING DIAGNOSIS FOR SCHOOL PSYCHOLOGISTS AND SUPPORT PERSONNEL** 3 credits
Prerequisite: 5200:630 or permission of instructor. This course will survey developmental reading and its relationship to reading difficulties. Formal and informal procedures for diagnosing disabled readers and a discussion of prescriptive strategies will be included.

- 692 ADVANCED STUDY AND RESEARCH IN READING INSTRUCTION** 3 credits
Survey of research comparison and evaluation of programs, design and development of projects in reading through group/individual study.
- 693 SUPERVISION AND CURRICULUM DEVELOPMENT IN READING INSTRUCTION** 2 credits
Relative to total curriculum; procedures for developing reading program in all curriculum areas; examination of children's literature and related instructional reading by supervisors and consultants.

SECONDARY EDUCATION

5300:

- 525 ADVANCED MICROCOMPUTER APPLICATIONS IN THE SECONDARY SCHOOLS** 3 credits (30 clinical hours)
Prerequisite: knowledge of BASIC programming is required. Advanced programming techniques reviewed, applied in program development appropriate for the secondary schools. Hardware, software, computer potential and limitations, languages, program types will be evaluated according to research findings and criteria applicable to secondary schools.
- 535 CONCEPTS AND CURRICULUM DESIGNS IN ECONOMIC EDUCATION** 3 credits
Economic education concepts appropriate for grade levels K-12 and adult education courses. Economic education materials developed to teach the concepts utilized.
- 575 VOCATIONAL BUSINESS EDUCATION** 3 credits
Prerequisite: senior status or permission. Principles of program construction, organization, implementation, evaluation, improvement, and development of program guides for both intensive and cooperative vocational business education.
- 590,1,2,3 WORKSHOP** 1-3 credits each
Individual work under staff guidance on curriculum problems, utilization of community resources, planning of curriculum units.
- 594 EDUCATIONAL INSTITUTES** 1-4 credits
Special courses designed as in-service upgrading programs, frequently provided with the support of national foundations.
- 619 SECONDARY SCHOOL CURRICULUM AND INSTRUCTION** 2 credits
Application of findings of recent research to curriculum building and procedures in teaching.
- 625 READING PROGRAMS IN SECONDARY SCHOOLS** 3 credits
For all subject teachers both with and without previous study in the teaching of reading. Materials, class organization and procedures for developing reading improvement programs for all secondary school and college students.
- 630 ADVANCED INSTRUCTIONAL TECHNIQUES IN BOOKKEEPING — ACCOUNTING AND BASIC BUSINESS SUBJECTS** 3 credits
Intensive examination of teaching-learning strategies for improvement of instruction. Emphasis on teacher coordination of methods, preplanned objectives and evaluation to insure maximum student competency in subject knowledge and skill.
- 632 ADVANCED INSTRUCTIONAL TECHNIQUES IN TYPEWRITING AND TYPEWRITING-RELATED SUBJECTS** 3 credits
Intensive examination of teaching-learning strategies for improvement of instruction. Emphasis on teacher coordination of methods, preplanned objectives and evaluation to ensure maximum student competency in subject knowledge and skill.
- 695 FIELD EXPERIENCE: MASTER'S** 1-6 credits
(May be repeated for a total of six credits) Prerequisites: permission of adviser and supervisor of field experience. On-the-job experience related to student's program of studies.
- 697 INDEPENDENT STUDY** 1-3 credits
(May be repeated for a total of six credits) Prerequisites: permission of adviser and supervisor of independent study. Area of study determined by student's needs.
- 698 MASTER'S PROBLEM** 2-4 credits
Prerequisite: permission of adviser. In-depth study of a research problem in education. Student must be able to demonstrate critical and analytical skills in dealing with a problem in secondary education.
- 699 THESIS RESEARCH** 4-6 credits
Prerequisite: permission of adviser. In-depth study of research problem in education. Student must be able to demonstrate critical and analytical skills in dealing with a problem in secondary education.
- 721 SUPERVISION OF INSTRUCTION IN THE SECONDARY SCHOOL** 2 credits
Definition of supervisory leadership role in improving instruction at secondary school level and development of practical theory of secondary school supervision.
- 780 SEMINAR IN SECONDARY EDUCATION** 2 credits
(May be repeated) Intensive examination of a particular area of secondary education.
- 781 RESIDENCY SEMINAR** 1 credit
(Must be repeated) One-hour weekly meeting for secondary education doctoral student in residence.
- 782 RESIDENCY SEMINAR** 1 credit
(Must be repeated) One-hour weekly meeting for secondary education doctoral student in residence.
- 895 FIELD EXPERIENCE: DOCTORAL** 1-6 credits
(May be repeated for a total of six credits) Prerequisites: permission of adviser and director of field experience. Intensive job-related experience pertinent to student's needs. Student must be able to demonstrate skills and leadership abilities in an on-the-job situation.
- 897 INDEPENDENT STUDY** 1-3 credits
(May be repeated for a total of six credits) Prerequisites: permission of adviser and director of independent study. Area of study determined by student's needs.
- 898 RESEARCH PROJECT IN SPECIAL AREAS** 1-2 credits
Prerequisite: permission of adviser. Critical and in-depth study of specific problem in secondary education.
- 899 DISSERTATION** 1-20 credits
Prerequisite: permission of adviser. Specific research problem that requires student to apply research skills and techniques pertinent to problem being studied.

TECHNICAL AND VOCATIONAL EDUCATION

5400:

- 500 THE POSTSECONDARY OCCUPATIONAL LEARNER** 3 credits
Describes the postsecondary occupational learner; studies issues, factors, and strategies pertinent to successful facilitation of learning in a variety of postsecondary occupational learning environments.
- 505 OCCUPATIONAL EDUCATION FOR YOUTH AND ADULTS** 3 credits
History and operations of current vocational education for youth and adults. Includes study of social, economic and political influences that stimulate growth and expansion of vocational education.
- 510 THE TWO-YEAR COLLEGE** 3 credits
Designed to introduce student to nature, purpose and philosophy of the two-year college. Includes examination of types of institutions offering two-year programs.
- 515 TRAINING IN BUSINESS AND INDUSTRY** 3 credits
Examines the role and mission of the training function in the modern industrial setting. Provides a foundation for a student planning to become an industrial trainer or training supervisor of technicians and other occupational skill-development levels.
- 521 INSTRUCTIONAL TECHNIQUES IN TECHNICAL EDUCATION** 4 credits
Selected topics in instructional techniques appropriate to post-secondary technical education. Emphasis on instructional methods, techniques in classroom, laboratory including tests, measurements.
- 530 COURSE CONSTRUCTION IN TECHNICAL EDUCATION** 2 credits
Procedure of breaking down an occupation to determine curriculum for laboratory and classroom, developing this content into an organized sequence of instructional units.
- 541 EDUCATIONAL GERONTOLOGY SEMINAR** 3 credits
Designed for person practicing in field of gerontology or preparing for a specialization in educational gerontology, including person responsible for development and implementation of courses, seminars, occupational training programs and workshops for older people.
- 551 HOME ECONOMICS JOB TRAINING** 3 credits
Prerequisite: senior standing or permission of instructor. Concept development in vocational home economics. Job training, program development, operational procedures, skill and knowledge identification, training profiles, job description and analysis. Individualized study guides. In-school and on-the-job observations.
- 590,1,2 WORKSHOP** 1-3 credits each
Individual work under staff guidance on curriculum problems, utilization of community resources, planning of curriculum units.
- 594 EDUCATIONAL INSTITUTES** 1-4 credits
Special courses designed as in-service upgrading programs, frequently provided with the support of national foundations.
- 610 COMMUNICATION WITH BUSINESS AND INDUSTRY** 2 credits
Techniques of establishing better communications between education and business and industry. Emphasis on the advisory committee, coordination functions and working with local professional associations in the community.
- 681 CURRENT ISSUES IN HIGHER EDUCATION** 2 credits
(May be repeated with change in topic) Examination of many current problems and issues in institutions of higher education; adult education, technical institutes, community colleges, proprietary schools, undergraduate, graduate and professional education.
- 690 INTERNSHIP: TEACHING VOCATIONAL EDUCATION**
- 691 INTERNSHIP: TEACHING TECHNICAL EDUCATION**
- 692 INTERNSHIP: POST-SECONDARY EDUCATION** 2 credits each
Teaching under supervision from the University and the educational institution. Includes a seminar each week.
- 695 FIELD EXPERIENCE: MASTER'S** 1-6 credits (30-180 field hours)
Prerequisites: permission of adviser and supervisor of field experience. On-the-job experience related to student's program of studies.
- 697 INDEPENDENT STUDY** 1-3 credits (30-90 field hours)
(May be repeated for a total of six credits) Prerequisites: permission of adviser and supervisor of field experience. On-the-job experience related to student's program of studies.
- 698 MASTER'S PROBLEM** 2-4 credits
Prerequisite: permission of adviser. In-depth study of a research problem in education. Student must be able to demonstrate critical and analytical skills in dealing with a problem in technical and vocational education.
- 699 THESIS RESEARCH** 4-6 credits
Prerequisite: permission of adviser. In-depth study of research problem in education. Student must be able to demonstrate critical and analytical skills in dealing with a problem in vocational education.

PHYSICAL EDUCATION

5550:

- 536 ADAPTED PHYSICAL EDUCATION TASKS FOR THE LEARNING DISABLED CHILD** 2 credits
Teaching methods and materials necessary to structure developmental tasks for learning disabled child; designed for a person preparing to teach elementary school physical education and special education.
- 541 ADVANCED ATHLETIC INJURY MANAGEMENT** 4 credits (30 clinical hours)
Prerequisites: 3100:206,207; suggested sequence, 5550:201, 202, 340. Advanced athletic training techniques for the student desiring to become a certified athletic trainer according to the regulations of the National Athletic Trainers Association.
- 542 THERAPEUTIC MODALITIES AND EQUIPMENT IN SPORTS MEDICINE** 3 credits (30 clinical hours)
Purpose is to develop techniques and skills among sports medicine personnel in the selection and implementation of therapeutic modalities and the equipment used in the rehabilitation of injuries to athletes.

- 590,1,2,3 WORKSHOP** 1-3 credits each
Practical, intensive and concentrated involvement with current curricular practices in areas related to physical education.
- 594 EDUCATIONAL INSTITUTIONS AND FOUNDATIONS** 1-4 credits
Practical experience with current research or curricular practices involving expert resource person in physical education, and usually financed by private or public funding.
- 601 ADMINISTRATION OF HEALTH, PHYSICAL EDUCATION, ATHLETICS AND RECREATION** 3 credits
Techniques of organization, administration and evaluation of health, physical education and recreation programs. Administrative policies of athletic programs at elementary, secondary and collegiate levels.
- 603 CURRICULUM PLANNING IN HEALTH AND PHYSICAL EDUCATION** 2 credits
Analysis of objectives, procedures and trends in curricula and principles and procedures for developing sound programs.
- 605 PHYSIOLOGY OF MUSCULAR ACTIVITY AND EXERCISE** 2 credits
Functions of body systems and physiological effects of exercise. Laboratory experiences, lectures, discussions.
- 606 MEASUREMENT AND EVALUATION IN PHYSICAL EDUCATION** 3 credits
Critical analysis of existing testing procedures and discussion and study of measurement and evaluation in terms of program needs.
- 608 SUPERVISION OF PHYSICAL EDUCATION** 2 credits
Principles involved in supervision of physical education service programs. Procedures and techniques of supervision of service classes at elementary, junior high and senior high school levels.
- 609 MOTIVATIONAL ASPECTS OF PHYSICAL ACTIVITY** 3 credits
Analysis of factors influencing motivation of motor performance with emphasis on competition, audience effects, aggression.
- 680 SPECIAL TOPICS IN HEALTH AND PHYSICAL EDUCATION** 2-4 credits
(May be repeated) Prerequisite: permission of instructor. Group study of special topics in health and physical education and sports medicine.
- 695 FIELD EXPERIENCE: MASTER'S** 1-6 credits
Prerequisite: permission of adviser. Participation in a work experience related to physical education. The experience may not be part of current position. Documentation of project required.
- 697 INDEPENDENT STUDY** 1-3 credits
Prerequisite: permission of adviser. In-depth analysis of current practices or problems related to physical education. Documentation of the study required.
- 698 MASTER'S PROBLEM** 2-4 credits
Prerequisite: permission of adviser. In-depth study of a research problem in education. Student must be able to demonstrate critical and analytical skills in dealing with a problem in physical education.
- 699 THESIS RESEARCH** 4-6 credits
Prerequisite: permission of adviser. In-depth research investigation. Student must be able to demonstrate necessary competencies to deal with a research problem in physical education.

OUTDOOR EDUCATION

5560:

- 550 APPLICATION OF OUTDOOR EDUCATION TO THE SCHOOL CURRICULUM** 4 credits
Provides knowledge, skills and techniques useful in application of outdoor education to school curriculum.
- 552 METHODS, MATERIALS AND RESOURCES FOR TEACHING OUTDOOR EDUCATION** 3 credits
Methodologies unique to outdoor education which incorporate a multisensory approach to learning. Instructional materials and resources which permit expansion of curriculum beyond the school building.
- 556 OUTDOOR PURSUITS** 4 credits
Investigation and participation in practical experiences in outdoor pursuits.
- 590 WORKSHOP: OUTDOOR EDUCATION** 1-3 credits
Practical application of contemporary ideas, methodologies, knowledge relevant to outdoor education. Emphasis on participant involvement in educational practices, utilizing the natural environment.
- 594 EDUCATIONAL INSTITUTES: OUTDOOR EDUCATION** 1-4 credits
Practical experience with current research or curricular practices involving expert resource persons in outdoor education.
- 600 OUTDOOR EDUCATION: RURAL INFLUENCES** 3 credits
Prerequisite: 550 or 552. Utilization of resources of rural area as a learning/teaching environment. Content and methodology appropriate for teaching school-age children in rural setting.
- 605 OUTDOOR EDUCATION: SPECIAL TOPICS** 2-4 credits
(May be repeated with change in topic) Prerequisite: permission of instructor. Group and individual study of special topics of contemporary concern in outdoor education.
- 690 PRACTICUM IN OUTDOOR EDUCATION** 2-4 credits (60-120 field hours)
Prerequisites: 550, 552 and permission of adviser. Supervised practical experience with existing outdoor education programs. In conjunction with practical work student meets regularly with adviser.
- 695 FIELD EXPERIENCE: MASTER'S** 2-6 credits (60-180 field hours)
Prerequisite: permission of adviser. Participation and documentation of practical professional experience related to outdoor education.
- 697 INDEPENDENT STUDY** 1-3 credits (70-90 field hours)
Prerequisite: permission of adviser. In-depth analysis of current practices or problems related to outdoor education. Documentation of study required.
- 698 MASTER'S PROBLEM** 2-4 credits
Prerequisite: permission of adviser. Intensive research study related to a problem in outdoor education or related discipline.
- 699 MASTER'S THESIS** 4-6 credits
An original composition demonstrating independent scholarship in a discipline related to outdoor education.

EDUCATIONAL GUIDANCE AND COUNSELING

5600:

- 526 CAREER EDUCATION** 2 credits
Prerequisite: junior, senior or graduate standing. Examination of current career education models and programs with emphasis on infusion of career education activities into elementary and secondary curriculum.
- 550 COUNSELING PROBLEMS RELATED TO LIFE-THREATENING ILLNESS AND DEATH** 3 credits
Prerequisite: permission. Consideration of the global issues, current research, coping behavior, support systems and family and individual needs in regard to life-threatening situations.
- 590,1,2 WORKSHOP** 1-3 credits each
Special instruction designed as in-service and/or upgrading individuals on current issues and practices in counseling.
- 593 WORKSHOP** 1-4 credits
Special instruction designed as in-service and/or upgrading individuals on current issues and practices in counseling.
- 594 COUNSELING INSTITUTE** 1-4 credits
In-service programs for counselors and other helping professionals.
- 600 SEMINAR IN COUNSELING** 1 credit
Prerequisite: counseling majors must elect 600 prior to electing 651 and/or within the first 10 credits of 5600 course work. Structured group experience designed to help a student assess selection of counseling as a profession.
- 602 INTRODUCTION TO COUNSELING** 2 credits
Understanding guidance and counseling principles including organization, operation and evaluation of guidance programs (designed for non-counseling major).
- 610 COUNSELING SKILLS FOR TEACHERS** 3 credits
Prerequisite: 631 or 633 or permission. The study and practice of selected counseling techniques that can be applied by teachers in working with students, parents and colleagues.
- 620 TOPICAL SEMINAR** 1-4 credits
Prerequisite: permission of instructor. Seminar on a topic of current interest in the profession. Staffing will be by department faculty and other professionals in counseling and related fields. A maximum of eight credits may be applied to a degree.
- 631 ELEMENTARY SCHOOL GUIDANCE** 3 credits
Introductory course: examines guidance and counseling practices.
- 633 SECONDARY SCHOOL GUIDANCE** 3 credits
Introductory course: examines guidance and counseling practices.
- 635 COMMUNITY COUNSELING** 3 credits
Overview of community and college counseling services; their evaluation, philosophy, organization and administration.
- 643 COUNSELING: THEORY AND PHILOSOPHY** 3 credits
Examination of major counseling systems including client-centered, behavioral and existential theories. Philosophical and theoretical dimension stressed.
- 645 GROUP TESTING IN COUNSELING** 3 credits
Study of evaluation and measurement procedures in counseling including instrument development, selection and use of aptitude tests, inventories and rating scales.
- 647 CAREER DEVELOPMENT AND COUNSELING ACROSS THE LIFE-SPAN** 3 credits
Overview of career development and choice over the life-span. Personal, family, and societal characteristics that affect choice, career choice, and implementation are discussed.
- 649 COUNSELING AND PERSONNEL SERVICES IN HIGHER EDUCATION** 3 credits
Prerequisite: 635 or permission of instructor. Counseling services as related to psychological needs and problems of the college student.
- 651 TECHNIQUES OF COUNSELING** 3 credits
Prerequisite: 643 or permission. Study and practice of selected counseling techniques and skills with emphasis on structuring, listening, leading and establishing a counseling relationship.
- 653 GROUP COUNSELING** 4 credits
Prerequisites: 643 and 645, or 3750:671 and 710 (703) or permission. Emphasis is placed on providing the student with the knowledge and understanding of theory, research and techniques necessary for conducting group counseling sessions.
- 655 MARRIAGE AND FAMILY THERAPY: THEORY AND TECHNIQUES** 3 credits
An overview of the theory and techniques of marital and family therapy, including exposure to the history, terminology and contributions of significant persons in the field.
- 657 CONSULTANT: COUNSELING** 3 credits
Prerequisites: 631, 651 or permission. Examination of consultation models with focus on process and product.
- 659 ORGANIZATION AND ADMINISTRATION OF GUIDANCE SERVICES** 3 credits
Prerequisite: 631 or 633 or permission. Development of a comprehensive articulated guidance and counseling program.
- 661 SEMINAR IN GUIDANCE** 2 credits
Prerequisites: 645, 647, 653 and 657. Primary models for understanding and modifying children's behavior in classroom including technique development and review of guidance materials and programs.
- 663 SEMINAR IN SCHOOL COUNSELING** 3 credits
Prerequisites: 633, 643, 645 and 647. Study of specific guidance techniques and materials useful to counselors working with the secondary school student, teacher and parents.
- 665 SEMINAR: COUNSELING PRACTICE** 3 credits
Prerequisite: 635 or permission. Study of topics of concern to a student specializing in community and college counseling. Topics may differ each semester according to students' needs.
- 667 MARITAL THERAPY** 3 credits
Prerequisite: 655. In-depth study of theories and interventions which focus on the nature and quality of marital relationships.
- 669 SYSTEMS THEORY IN FAMILY THERAPY** 3 credits
Prerequisite: 655. In-depth exploration of systems theory in family therapy. Major assumptions of systems theory will be examined and the implications for interventions will be explored.
- 671 COUNSELING CLINIC** 1-3 credits
Prerequisite: permission. Closely supervised application and integration of diagnostic, counseling and consultant skills in clinical setting.
- 675 PRACTICUM IN COUNSELING I** 5 credits
Prerequisite: 653. Supervised counseling experience with individuals and small groups.
- 676 PRACTICUM IN COUNSELING II** 2-5 credits
Prerequisite: 675. Advanced supervised counseling experience.
- 685 INTERNSHIP** 1-4 credits
(May be repeated for a total of six credits) Prerequisite: 676. Paid or unpaid supervised experience in counseling in a work setting. Must also take either 663 or 665 during first semester of internship.
- 695 FIELD EXPERIENCE: MASTER'S** 1-10 credits
Prerequisites: permission of adviser and department head. Placement in selected setting for purpose of acquiring experiences and/or demonstrating skills related to student's counseling program.
- 697 INDEPENDENT STUDY** 1-3 credits
(May be repeated for a total of nine credits) Prerequisites: permission of adviser and department head. Specific area of investigation determined in accordance with student needs.
- 698 MASTER'S PROBLEM** 2-4 credits
Prerequisite: permission of adviser. In-depth study of a research problem in education. Student must be able to demonstrate critical and analytical skills in dealing with a problem in educational guidance and counseling.
- 699 THESIS RESEARCH** 4-6 credits
Prerequisites: permission of adviser and department head. In-depth study and analysis of counseling problem.
- 702 ADVANCED COUNSELING PRACTICUM** 4 credits
(May be repeated for a total of 12 credits) Prerequisite: doctoral residency or permission. Examination of theories of individual age group counseling along with supervised counseling experience in selected settings.
- 707,6 SUPERVISION IN COUNSELING PSYCHOLOGY I, II** 3 credits each
Prerequisite: doctoral residency or permission. Instruction and experience in supervising a graduate student in counseling.
- 710 THEORIES OF COUNSELING AND PSYCHOTHERAPY** 4 credits
Prerequisite: 3750:630 or departmental permission. Major systems of individual psychotherapy explored within a philosophy of science framework: Freudian, behavioral, Rogerian, cognitive and other. Includes research, contemporary problems and ethics.
- 711 VOCATIONAL BEHAVIOR** 4 credits
Prerequisite: 3750:630 or departmental permission. Theories and research on vocational behavior and vocational counseling. Topics include major theories on vocational behavior, empirical research on these theories, applied work in vocational counseling and applied research.
- 712 PRINCIPLES AND PRACTICE OF INDIVIDUAL INTELLIGENCE TESTING** 4 credits
Prerequisites: 630 or graduate standing in school psychology, and instructor's permission. History, principles and methodology of intelligence testing, supervised practice in administration, scoring and interpretation of individual intelligence tests for children and adults.
- 713 ADVANCED SEMINAR IN COUNSELING PSYCHOLOGY** 4 credits
Prerequisite: doctoral residency or permission. Examination of major issues in the field such as the counselor as a professional and as a person, and issues, problems and trends in counseling.
- 714 OBJECTIVE PERSONALITY EVALUATION** 4 credits
Prerequisites: completion of 3750:400/500, 3750:420/520, and 3750:750 or 5600:645 or permission. Study of the development, administration, and interpretation of objective instruments for personality assessment (MMPI, CPI, MBTI, 16 PF and selected additional inventories).
- 715 RESEARCH DESIGN IN COUNSELING I** 3 credits
Prerequisite: doctoral residency or permission. Study of research designs, evaluation procedures and review of current research.
- 716 RESEARCH DESIGN IN COUNSELING II** 3 credits
Prerequisite: 704. Computer analysis of data related to counseling problem. Development of research proposal.
- 720 TOPICAL SEMINAR: GUIDANCE AND COUNSELING** 1-3 credits
Prerequisite: permission of instructor. A topical study with a variety of disciplinary input. Staffing will be by department faculty and other professionals in counseling and related fields. A maximum of six credits may be applied to a degree.
- 755 ASSESSMENT METHODS AND TREATMENT ISSUES IN MARRIAGE AND FAMILY THERAPY** 3 credits
Prerequisites: Doctoral standing or permission. Provides advanced counseling students with the knowledge and skills in assessment methods, techniques and instruments relevant to the practice of marriage and family therapy.
- 758 OUTCOME RESEARCH IN MARRIAGE AND FAMILY THERAPY** 3 credits
Prerequisite: 667; 5100:640, 741. This course will provide an in-depth examination of marriage and family therapy outcome research.
- 796 COUNSELING PSYCHOLOGY PRACTICUM** 4 credits
(May be repeated for a total of 12 credits) Advanced counseling psychology students will have supervised training with clients in a variety of settings and will focus on supervised development of specialized theoretical applications.
- 797 INDEPENDENT READING AND/OR RESEARCH IN COUNSELING PSYCHOLOGY** 1-5 credits
(May be repeated) Prerequisite: permission of instructor. Independent readings and/or research in an area of counseling psychology under the direction of a faculty member.
- 895 FIELD EXPERIENCE: DOCTORAL** 1-6 credits
(May be repeated) Prerequisite: doctoral candidate status. Placement in selected setting for purpose of acquiring experiences and/or developing skills related to student's doctoral program.
- 897 INDEPENDENT STUDY** 1-3 credits
(May be repeated for a total of nine credits) Prerequisites: permission of adviser and department head. Specific area of investigation determined in accordance with student needs.
- 898 RESEARCH PROJECTS IN SPECIAL AREAS** 1-2 credits
(May be repeated) Prerequisites: permission of adviser and department head. Study, analysis and reporting of counseling problem.
- 899 DISSERTATION** 1-20 credits
Prerequisites: permission of major doctoral adviser and department head. Study, design and analysis of counseling problem.

SPECIAL EDUCATION**5610:**

- 540 DEVELOPMENTAL CHARACTERISTICS OF EXCEPTIONAL INDIVIDUALS** 3 credits
Identification, developmental characteristics, and treatment procedures for atypical children and youth in both regular and special education facilities.
- 541 DEVELOPMENTAL CHARACTERISTICS OF THE MENTALLY RETARDED** 4 credits
Prerequisites: 440/540. A survey of the etiology, diagnoses, classification, and developmental characteristics of individuals with mental retardation and developmental disabilities. This course will include individuals classified at all levels of mental retardation: mild, moderate, severe, and profound.
- 543 DEVELOPMENTAL CHARACTERISTICS OF THE SPECIFIC LEARNING DISABLED** 3 credits
Prerequisite: 440/540. Survey of etiology, diagnosis, classification and developmental characteristics of learning disabled individuals.
- 544 DEVELOPMENTAL CHARACTERISTICS OF INTELLECTUALLY GIFTED INDIVIDUALS** 3 credits
Prerequisite: 440/540. Survey of etiology, diagnosis, classification and developmental characteristics of intellectually gifted individuals.
- 545 DEVELOPMENTAL CHARACTERISTICS OF ORTHOPEDICALLY HANDICAPPED INDIVIDUALS** 3 credits
Prerequisite: 440/540. Etiology, diagnosis, classification, developmental characteristics of the orthopedically handicapped individuals.
- 548 DEVELOPMENTAL CHARACTERISTICS OF THE SEVERE BEHAVIOR HANDICAPPED** 3 credits
Etiology, diagnosis, classification, developmental characteristics of the socially and emotionally maladjusted individuals.
- 550 SPECIAL EDUCATION PROGRAMMING: EARLY CHILDHOOD** 3 credits
Typical and atypical developmental patterns of young children, assessment and implication of handicapping conditions with respect to early intervention and supportive services.
- 551 SPECIAL EDUCATION PROGRAMMING: ELEMENTARY LEVEL** 3 credits
Prerequisite: 450/550. Educational implications in regard to assessment teaching strategies, adaptive materials, evaluations, that are necessary to meet the needs of elementary level exceptional children.
- 552 SPECIAL EDUCATION PROGRAMMING: SECONDARY/VOCATIONAL** 3 credits
Prerequisite: 450/550. Study of diagnostic prescriptive service delivery systems designed to accommodate developmental patterns of secondary-level exceptional children.
- 555 EDUCATIONAL ADJUSTMENT FOR INTELLECTUALLY GIFTED INDIVIDUALS** 3 credits
Prerequisite: 444/544. Study of programs, services and educational experiences designed to accommodate developmental patterns of intellectually gifted individuals.
- 556 SPECIAL EDUCATION PROGRAMMING: SEVERE BEHAVIOR HANDICAPPED** 3 credits
Prerequisites: 446/546. Students will develop teaching materials, assessment techniques, and IEPs for SBH individuals. Data evaluation and theoretical orientations will be stressed.
- 557 SPECIAL EDUCATION PROGRAMMING: ORTHOPEDICALLY HANDICAPPED** 3 credits (20 field hours)
Prerequisites: 445/545, 451/551, 452/552. Study of programs, services, educational experiences, and adaptations designed to accommodate individuals who are orthopedically handicapped and/or chronically health impaired.
- 558 INTERDISCIPLINARY PROGRAMMING IN SPECIAL EDUCATION** 3 credits
Prerequisite: permission of instructor. A study of the programs, interdisciplinary services, educational techniques designed to accommodate the needs of MSPR multi handicapped and orthopedically handicapped individuals.
- 559 COMMUNICATION AND CONSULTATION WITH PARENTS AND PROFESSIONALS** 3 credits
Prerequisite: 440/540. Provides the prospective special education teacher with skills in communication and consultation for working with parents of exceptional individuals and other professionals.
- 561 TECHNOLOGY AND MATERIALS APPLICATION IN SPECIAL EDUCATION** 3 credits
Prerequisite: 5100:310 or permission of instructor. Microcomputer operation and programming in special education; operation and use of unique audio or visual tools for handicapped and/or adaptive use of traditional equipment; overview of curriculum materials designed for exceptional learner.
- 562 EDUCATING EXCEPTIONAL CHILDREN IN THE REGULAR CLASSROOM** 3 credits
For non-special education majors, teaching and administrative personnel in the field. This course focuses on the skills and competencies needed (by regular educators) in working successfully with mainstreamed exceptional children.
- 563 ASSESSMENT IN SPECIAL EDUCATION** 3 credits
Prerequisite: 440/540. Prepares student to select, administer and interpret formal and informal assessment procedures and use resulting data in planning educational programs for exceptional individuals.
- 565 NEUROMOTOR ASPECTS OF PHYSICAL DISABILITIES** 3 credits
Prerequisites: 454/554 or 457/557. Provides the student with a basic knowledge of the human neuromuscular system and the impact of neuromuscular damage on the form and function of movement and behavior.
- 566 RECREATIONAL PROGRAMS FOR EXCEPTIONAL INDIVIDUALS** 3 credits
Prerequisite: 440/540. Study experience which examines crafts and outdoor recreational programming for exceptional individuals.
- 567 CLASSROOM BEHAVIOR MANAGEMENT** 3 credits
Review of behavior management principles, and the development of application models for exceptional children in the classroom.

- 568 ADVANCED BEHAVIOR MANAGEMENT** 3 credits
Prerequisites: 467/567. Advanced techniques for remediating problematic behavior, establishing effective repertoires and evaluating research relevant to classroom management will be covered. Behavioral theory will be stressed.
- 570 CLINICAL PRACTICUM IN SPECIAL EDUCATION** 3 credits
Prerequisite: Permission of instructor. Provides a laboratory experience for students to conduct psychoeducational study with students exhibiting learning/behavioral problems in school.
- 571 CLINICAL PRACTICUM IN GIFTED EDUCATION** 3 credits
Prerequisites: 444/544, 455/555. A supervised clinical experience with individuals or small groups designed to provide practice in diagnostic and instructional intervention with gifted students.
- 579 SEMINAR: INVITATIONAL STUDIES IN SPECIAL EDUCATION** 1-2 credits
(May be repeated for a total of four credits) Topical study with a varied array of disciplinary input. Staffing will be invited members of allied and contributing professions active in management of exceptional children.
- 601 SEMINAR: SPECIAL EDUCATION CURRICULUM PLANNING** 3 credits
Prerequisite: certification in an area of special education. Study of curriculum planning practices unique to special education classes and services. Appropriate curriculum objectives for selected areas of instruction as well as effective organizational programs examined.
- 602 SUPERVISION OF INSTRUCTION** 3 credits
Prerequisite: certification in an area of special education. Study of administration and supervisory practices unique to special education classes and services.
- 603 ASSESSMENT AND EDUCATIONAL PROGRAMMING** 3 credits
Prerequisite: certification in an area of special education or permission of instructor. Overviews psychodiagnostic approach in assessment of handicapped individuals and examines methods for designing individual programming based on formal and informal assessment. Program management also examined.
- 604 EDUCATION AND MANAGEMENT STRATEGIES FOR PARENTS OF EXCEPTIONAL INDIVIDUALS** 3 credits
Prerequisite: certification in an area of special education and/or permission of instructor. Methods of working with parents to facilitate effective programs for handicapped individuals. Strategies for providing support and educational services for parents examined.
- 605 PROGRAM DEVELOPMENT AND SERVICE DELIVERY SYSTEMS** 3 credits
Prerequisite: certification in special education and/or permission of instructor. Provides strategies for community analysis, case findings, funding sources and practices, and development of program models and service delivery systems to serve the handicapped.
- 606 RESEARCH DESIGN AND PRACTICE IN SPECIAL EDUCATION** 3 credits
Prerequisite: 5100:640. An in-depth examination of qualitative research, single subject design, hypothesis generation and methodological practices unique to individual research and its application to special populations.
- 612 SEMINAR: ISSUES IN SPECIAL EDUCATION** 3 credits
Prerequisite: 25 hours of graduate study in special education and/or permission of the instructor. A culminating seminar for graduate students in special education designed to study, examine and reflect upon current trends, issues and practices.
- 691 STUDENT TEACHING SEMINAR** 1 credit
Taken concurrently with Student Teaching. Review and discussion of issues raised during teaching experience.
- 692 STUDENT TEACHING: SCHOOL AUDIOLOGY** 6 credits
Prerequisite: Permission of advisor. Directed teaching under supervision of a special teacher and a University supervisor.
- 693 STUDENT TEACHING: SPEECH LANGUAGE PATHOLOGY** 6 credits
Prerequisite: Permission of advisor. Directed teaching under supervision of a special teacher and a University supervisor.
- 694 RESEARCH PROJECT IN SPECIAL AREA (SCHOLARLY PAPER)** 3 credits
Prerequisite: Culminating experience in master's program. An in-depth study of an identified topic in special education, culminating in a scholarly paper.
- 695 FIELD EXPERIENCE: MASTER'S** 1-4 credits
(May be repeated for a total of eight credits) Designed to provide on-the-job experience in a special education program on an individual basis.
- 697 INDEPENDENT STUDY** 1-3 credits
(May be repeated for a total of nine credits) Prerequisites: permission of adviser and supervisor of independent study. Specific area of investigation determined in accordance with student's needs.
- 698 MASTER'S PROBLEM** 2-4 credits
Prerequisite: permission of adviser. In-depth study of a research problem in education. Student must be able to demonstrate critical and analytical skills in dealing with a problem in special education.
- 699 THESIS RESEARCH** 4-6 credits
Thorough study and analysis in depth of an educational problem, field projects in special areas; synthesis of existing knowledge in relationship to a specific topic.

SCHOOL PSYCHOLOGY**5620:**

- 590 WORKSHOP** 1-2 credits
Prerequisite: permission of instructor. Opportune topical experience provided periodically as needed and/or as resources become available.
- 591.2 WORKSHOP** 1-3 credits each
Prerequisite: permission of instructor. Opportune topical experience provided periodically as needed and/or as resources become available.
- 594 SCHOOL PSYCHOLOGY INSTITUTES** 1-4 credits
Prerequisite: permission of instructor. Specifically designed learning experience for program graduate focusing on critical topics.
- 600 SEMINAR: ROLE AND FUNCTION OF THE SCHOOL PSYCHOLOGIST** 3 credits
Prerequisite: permission of instructor. Seminar on role and function of school psychologist. The course, tailored to meet individual needs of trainees, is a consideration of professional standards of school psychology practice.

- 601 COGNITIVE FUNCTION MODELS FOR PRESCRIPTIVE EDUCATIONAL PLANNING** 3 credits
Prerequisite: permission of instructor. Consideration of cognitive development theories and their application for educational programming.
- 602 BEHAVIORAL ASSESSMENT** 3 credits
Prerequisite: permission of instructor. Overview of behavioral theory and its application focusing upon the role of the school psychologist as an agent of behavior change.
- 603 CONSULTATION STRATEGIES IN SCHOOL PSYCHOLOGY** 3 credits
Prerequisite: permission of instructor. A consideration of consultant roles in the practice of school psychology as related to consultant process and with school and agency personnel, parents and children.
- 610 EDUCATIONAL DIAGNOSIS FOR SCHOOL PSYCHOLOGISTS** 4 credits
Prerequisite: permission of instructor. Clinical study and application of current assessment approaches applicable in assessment of children's learning problems.
- 611 PRACTICUM IN SCHOOL PSYCHOLOGY** 4 credits
Prerequisite: permission of instructor. Laboratory experience in psycho-educational study of individual children who have learning problems in school. (Repeat requirement).
- 630,1 INTERNSHIP IN SCHOOL PSYCHOLOGY: FALL/SPRING** 3 credits each
Prerequisite: permission of instructor. Full-time paid work assignment under supervision of a qualified school psychologist for an academic year structured according to provisions of State Department of Education. Additional readings required.
- 640 FIELD SEMINAR I: ISSUES AND ASSESSMENTS (FALL)** 3 credits
Prerequisite: permission of instructor. Consideration of pertinent topics in practice of school psychology with emphasis on field-based problems and issues of a practicing school psychologist.
- 641 FIELD SEMINAR II: CLASSROOM ENVIRONMENT (SPRING)** 3 credits
Prerequisite: permission of instructor. Consideration of pertinent topics in practice of school psychology with emphasis on field-based problems and issues of a practicing school psychologist.
- 694 RESEARCH PROJECT IN SPECIAL AREAS** 1-3 credits
Prerequisite: permission of adviser. Study, analysis and reporting of school psychology problem.
- 695 FIELD EXPERIENCE: MASTER'S** 1-3 credits
Prerequisite: permission of instructor. Practical school psychology-related experience in school setting.
- 697 INDEPENDENT STUDY** 1-4 credits
Prerequisites: permission of adviser and supervisor of the independent study. Documentation of specific area of investigation. Nature of the inquiry to be determined by student-supervisor agreement.
- 698 MASTER'S PROBLEM** 2-4 credits
Prerequisite: permission of adviser. In-depth study of a research problem in education. Student must be able to demonstrate critical and analytical skills in dealing with a problem in school psychology.
- 699 THESIS RESEARCH** 4-6 credits
Prerequisite: permission of instructor. Thorough study, analysis and reporting in depth of an educational problem; field projects in special areas; synthesis of existing knowledge in relationship to specific topic.

MULTICULTURAL EDUCATION

5630:

- 581 MULTICULTURAL EDUCATION IN UNITED STATES** 3 credits
Inquiry into multicultural dimensions of American education. Comparisons of urban, suburban and rural educational settings with reference to socioeconomic differences.
- 582 CHARACTERISTICS OF CULTURALLY DIFFERENT YOUTH** 3 credits
Study of characteristics of culturally different youth with focus on youth in low-income areas. Emphasis on cultural, social, economic and educational considerations and their implications.
- 583 PREPARATION FOR TEACHING CULTURALLY DIFFERENT YOUTH** 3 credits
Designed to help prepare trainees to teach culturally different youth from low-income backgrounds. Through use of multimedia source materials trainees gain knowledge of background and culture of culturally different learners, determine role of teacher, explore techniques of discipline and classroom management, survey motivational and instructional techniques and examine, prepare and adapt variety of instructional materials for individual, small group and large group instruction.
- 584 PRINCIPLES OF BILINGUAL/MULTICULTURAL EDUCATION** 3 credits
An introduction to the theoretic, cultural, sociolinguistic bases of bilingual/multicultural education. Legislation, court decisions, program implementation included.
- 585 TEACHING READING AND LANGUAGE ARTS TO BILINGUAL STUDENTS** 4 credits
Prerequisite: permission of instructor. Course applies methodologies for teaching reading, language arts in the bilingual/multicultural classroom. The bilingual student's native language, culture stresses.
- 586 TEACHING MATHEMATICS, SOCIAL STUDIES AND SCIENCE TO BILINGUAL STUDENTS** 3 credits
Prerequisites: elementary education majors, 5200:333, 336, 338; for secondary education majors, 5300:311 (science, social studies or mathematics). Course applies methodologies for teaching mathematics, science, social studies in the bilingual/multicultural classroom. The bilingual student's native language stressed.
- 587 TECHNIQUES FOR TEACHING ENGLISH AS A SECOND LANGUAGE IN THE BILINGUAL CLASSROOM** 4 credits
Prerequisite: permission of instructor. Course includes teaching language skills to limited English Proficient students in grades K-12, administration of language assessment tests, selection and evaluation of materials.
- 590 WORKSHOP: BILINGUAL/MULTICULTURAL** 1-3 credits
Emphasizes development of teaching devices and/or curriculum units, demonstration of teaching techniques, utilization of community resources.
- 686 SEMINAR: EDUCATION OF THE CULTURALLY DIFFERENT** 2 credits
Survey of educational considerations for schools populated by low-income culturally different youth. Field experience in form of visitations to agencies serving low-income families required.

EDUCATIONAL ADMINISTRATION

5700:

- 590,1,2,3 WORKSHOP** 1-3 credits each
Individual work under staff guidance on curriculum problems, utilization of community resources, planning of curriculum units.
- 594 EDUCATIONAL INSTITUTES** 1-4 credits
Special courses designed as in-service upgrading programs, frequently provided with the support of national foundations.
- 601 PRINCIPLES OF EDUCATIONAL ADMINISTRATION** 3 credits
A perspective of educational administration and the context in which it operates, with emphasis on the processes, tasks, roles and relationships involved and career opportunities.
- 602 SCHOOL BUSINESS ADMINISTRATION** 2 credits
An examination of the changing role of today's school business administrator and study of major business functions from the perspectives of principals, business administrators and superintendents.
- 603 ADMINISTRATION OF EDUCATIONAL PERSONNEL** 2 credits
A perspective on human resources management and a practical orientation to the major dimensions of the personnel function.
- 604 SCHOOL-COMMUNITY RELATIONS** 3 credits
An analysis of the principles, practices, and materials that facilitate the adjustment and interpretation of schools to their internal and external publics.
- 606 EVALUATION IN EDUCATIONAL ORGANIZATIONS** 3 credits
An examination of the general concepts, models, practical applications and considerations involved in the evaluation of educational organizations including program evaluation, performance appraisal and operational evaluation.
- 607 SCHOOL LAW** 2 credits
An examination of the legal principles underlying education in United States as reflected in statutory provisions, court decisions and administrative orders.
- 608 SCHOOL FINANCE AND ECONOMICS** 3 credits
A study of financial operations of school systems, including taxes, other sources of revenue, expenditures, budgeting and the effects of economic factors.
- 609 PRINCIPLES OF CURRICULUM DEVELOPMENT** 3 credits
An overview and analysis of educational and instructional programs emphasizing the basic purposes, functions and structures necessary to shape, implement and evaluate them.
- 610 PRINCIPLES OF EDUCATIONAL SUPERVISION** 3 credits
Study of principles, organizations and techniques of supervision with view to improvement of instruction.
- 611 SUPERVISION OF STUDENT TEACHING** 2 credits
Primarily for supervising teachers in guidance of student teachers. Topics include readiness for student teaching, directing teacher and college supervisor relationships, use of the conference, demonstration and observation.
- 612 ADMINISTRATION OF EDUCATIONAL FACILITIES** 2 credits
A comprehensive view of the principles, practices and new dimensions involved in the planning and management of educational facilities.
- 613 ADMINISTRATION OF PUPIL SERVICES** 2 credits
Overview of pupil services including analysis of the nature and development of each component program and discussion of current issues and trends.
- 615 COMPUTER APPLICATIONS IN EDUCATIONAL ADMINISTRATION** 2 credits
A practical course providing hands-on experience with basic software programs, computer-assisted instruction and word processing for administrators and educational organizations.
- 620 SECONDARY SCHOOL ADMINISTRATION** 3 credits
An orientation to the secondary principal's role and working relationships and an examination of the principles and strategies involved in successfully administering a secondary school.
- 631 ELEMENTARY SCHOOL ADMINISTRATION** 3 credits
Examination of the elementary school principalship as it relates to the development and maintenance of a school climate most conducive to learning.
- 684 FIELD EXPERIENCE I: ELEMENTARY ADMINISTRATION** 2 credits
A supervised, on-the-job administration experience in staff personnel, pupil personnel, curriculum, community relations, finance and physical facilities.
- 686 FIELD EXPERIENCE I: SECONDARY ADMINISTRATION** 2 credits
A cooperative field-based experience in a secondary school involving observation and activities in the administrative task areas.
- 694 FIELD EXPERIENCE II: ELEMENTARY ADMINISTRATION** 3 credits
Prerequisites: 684 and permission of instructor. Culmination of the preparatory program for elementary school principals in which students perform administrative tasks supervised by experience principals.
- 695 FIELD EXPERIENCE FOR SUPERVISORS** 2 credits
Prerequisite: completion of all course work except research problem. Designed to help student test and develop understandings and skills in supervision. Student participates in selected task areas which reflect supervisory responsibilities.
- 696 FIELD EXPERIENCE II: SECONDARY ADMINISTRATION** 3 credits
A cooperative, field-based experience in a secondary school with emphasis on project performance in the administrative task areas.
- 697 INDEPENDENT STUDY** 1-3 credits
(May be repeated for a total of six credits) Prerequisites: permission of adviser and supervisor of the independent study. Area of study determined by student's needs.
- 698 MASTER'S PROBLEM** 2-4 credits
Prerequisite: permission of adviser. In-depth study of a research problem in education. Student must be able to demonstrate critical and analytical skills in dealing with a problem in educational administration.
- 699 THESIS RESEARCH** 4-6 credits
Prerequisite: permission of adviser. In-depth study of a research problem in education. Student must be able to demonstrate critical and analytical skills in dealing with a problem in educational administration.
- 704 ADVANCED PRINCIPLES OF EDUCATIONAL ADMINISTRATION** 2 credits
Study of organizations and strengths and weaknesses of common methods of administering them. Practical means by which overcoming bureaucratic weaknesses of bureaucracies are offset or lessened in educational institutions.

- 705 DECISION MAKING IN EDUCATIONAL ADMINISTRATION** 3 credits
Decision making is portrayed as a central function of the educational administrator with a united presentation of the theory, research and practice of decision making.
- 706 COLLECTIVE BARGAINING AND EMPLOYEE RELATIONS** 2 credits
An overview of collective bargaining in education and a comprehensive look at the mechanics and issues involved in the bargaining process and contract administration.
- 707 THE SUPERINTENDENCY** 3 credits
An orientation to the superintendent's role and an examination of the strategies for dealing with the major relational and functional aspects of the superintendency.
- 720 TOPICAL SEMINAR: EDUCATIONAL ADMINISTRATION** 1-3 credits
(May be repeated) Prerequisite: permission of instructor. Topical studies in selected areas of concern to students, practicing administrators in public, private educational institutions, organizations.
- 730 RESIDENCY SEMINAR** 3 credits
Prerequisite: 601. Focus on recent research in administration and educational administration theory.
- 731 RESIDENCY SEMINAR** 3 credits
Current administrative problems in educational institutions as perceived by student and practicing school executives. Emphasis on problem management, amelioration or solution. Field visits or resource persons invited to classroom.
- 732 ORGANIZATIONAL COMMUNICATIONS AND THE SCHOOL ADMINISTRATOR** 3 credits
Fundamentals in interpersonal communications. Application of these principles to roles of educational administrators. Skill development in written and spoken communications, with attention to nonverbal communications; simulation and role playing.
- 733 THE EDUCATIONAL ADMINISTRATOR AND PLANNED CHANGE** 2 credits
Prerequisites: 601 and 704. Relationship between technological and social change and needed change in education; theories, principles and mechanisms in planned educational change.
- 740 THEORIES OF EDUCATIONAL SUPERVISION** 3 credits
Prerequisites: 610, 5200:732 or 5300:721. Explanation and examination of various theories of supervision; sample models which implement existing theories.
- 745 PRACTICUM IN EDUCATIONAL ADMINISTRATION: URBAN SETTING** 2 credits
Prerequisite: completion of three-fourths of doctoral program courses. Analysis of uniquenesses of urban setting, e.g., multicultural and pluralistic urban populations. Stress on administrator's human relation skills.
- 748 POLITICS, POWER AND THE SCHOOL ADMINISTRATOR** 3 credits
Impacts of formal and informal community power structures and influential persons on educational planning and decision making. Administrator as an influence on the power structure for educational benefit.
- 747 PRACTICUM: COMPETING AND COMPLEMENTARY SOCIAL SYSTEMS** 3 credits
Designed to bring educational administrator into direct contact with individuals responsible for other community service delivery systems, e.g., city government. Methods of interagency cooperation to provide client services.
- 795.8 INTERNSHIP IN EDUCATIONAL ADMINISTRATION** 2 credits each
(May be repeated for a total of six credits) Work under a practicing administrator involving experience in optimum number of administrative tasks. Includes seminars and written work.
- 895 FIELD EXPERIENCE: THE SUPERINTENDENCY** 2 credits
Prerequisite: permission of instructor. Cooperative, field-based experience in central office of a school district in which student performs assignments in administrative task areas.
- 898 FIELD EXPERIENCE IN SCHOOL PLANT PLANNING** 2 credits
Prerequisite: permission of instructor. Selected field experiences. Emphasis on analysis of school enrollments, evaluation of school plants and financial aspects of plant planning.
- 897 INDEPENDENT STUDY** 1-3 credits
(May be repeated for a total of six credits) Prerequisite: permission of adviser. In-depth study of a research problem in education. Student must be able to demonstrate critical and analytical skills in dealing with a problem in secondary education.
- 898 RESEARCH PROJECT IN SPECIAL AREAS** 1-2 credits
Prerequisite: permission of adviser. Critical and in-depth study of specific problem in educational administration.
- 899 DISSERTATION** 1-20 credits
Prerequisite: permission of adviser. Specific research problem that requires student to apply research skills and techniques to the problem being studied.

SPECIAL EDUCATIONAL PROGRAMS

5800:

- 590 WORKSHOP IN ECONOMIC EDUCATION OR IN SOCIAL STUDIES** 1-3 credits
Individual work under staff guidance on curriculum problems; utilization of community resources; planning of curriculum units.
- 591 WORKSHOP IN ARITHMETIC OR IN PHYSICAL SCIENCE** 1-3 credits
Individual work under staff guidance on curriculum problems; utilization of community resources; planning of curriculum units.
- 592 WORKSHOP IN READING** 1-3 credits
Individual work under staff guidance on curriculum problems; utilization of community resources; planning of curriculum units.
- 593 WORKSHOP ON EXCEPTIONAL CHILDREN** 1-3 credits
Individual work under staff guidance on curriculum problems; utilization of community resources; planning of curriculum units.
- 594 INTERNATIONAL SCHOOL STUDY** 3-6 credits
On-the-scene study of education in foreign countries, usually by concentrating on the study of schools in one restricted geographical area.

HIGHER EDUCATION ADMINISTRATION

5900:

- 700 INTRODUCTORY ADMINISTRATIVE COLLOQUIUM IN HIGHER EDUCATION** 1 credit
Introductory examination of issues, trends, topics and activities in institutions of higher education.
- 715 SEMINAR IN HIGHER EDUCATION: ADMINISTRATION IN HIGHER EDUCATION** 3 credits
Prerequisite: 5700:704 or permission. In-depth study of problems, procedures and principles of administration in institutions of higher education. Emphasis is placed on the administrative process and major administrative task areas.
- 725 SEMINAR IN HIGHER EDUCATION: STUDENT SERVICES** 3 credits
Prerequisite: permission. Topics of concern to student specializing in student personnel services in higher education. Topics may differ each semester depending upon specific student needs and interests.
- 730 HIGHER EDUCATION CURRICULUM AND PROGRAM PLANNING** 3 credits
Study of strategies for implementing and monitoring the curricular change process. Broad aspects of higher education program planning shall be examined.
- 735 INSTRUCTIONAL STRATEGIES AND TECHNIQUES FOR THE COLLEGE INSTRUCTOR** 3 credits
Selected topics in instructional theory, techniques and strategies which are appropriate to instructional planning and development of college-level courses. Criterion-reference formating is emphasized, including student achievement testing and evaluation.
- 745 INDEPENDENT STUDY IN HIGHER EDUCATION** 1-3 credits
(May be repeated for a total of six credits) Prerequisite: permission. Selected area of independent investigation in an area of higher education as determined by adviser and student in relation to student's academic needs and career goals.
- 800 ADVANCED ADMINISTRATIVE COLLOQUIUM IN HIGHER EDUCATION** 1 credit
(May be repeated) Prerequisite: permission. Examination of selected perspectives and topics which pose concerns to participating students.
- 801 INTERNSHIP IN HIGHER EDUCATION** 1-3 credits
(May be repeated for a total of six credits) Prerequisite: permission; corequisite: 802. Intensive work experience in operations of an institution of higher education, related to student's own program of studies and professional goals.
- 802 INTERNSHIP IN HIGHER EDUCATION SEMINAR** 1 credit
(May be repeated for a total of three credits) Prerequisite: permission; corequisite: 801. To be taken in conjunction with internship for synthesis of problems encountered in internship experience and to provide the opportunity to share ideas and experiences from various areas of higher education internship placement.

College of Business Administration

ACCOUNTANCY 6200:

- 520 ADVANCED ACCOUNTING** 3 credits
Prerequisite: 318. Examination of accounting theory emphasizing accounting for business combinations, partnerships, foreign operations, nonprofit entities and consolidated statements.
- 530 TAXATION I** 4 credits
Prerequisite: 317. Application of current federal tax law to individuals and proprietorships. Types of income, deductions and structure of tax return covered. Master of Taxation students will not be able to take this course to satisfy tax electives in the Master of Taxation program.
- 531 TAXATION II** 3 credits
Prerequisite: 430/530. Application of current federal tax law to partnerships, corporations, trusts, estates and gifts. Social security taxes and Ohio income, sales and personal property taxes discussed.
- 540 AUDITING** 4 credits
Prerequisites: 301, 318, 355 and 6500.322 must be taken prior to or concurrently, or permission of instructor. Examines auditing standards and procedures used by independent auditor in determining whether a firm has fairly represented its financial position.
- 570 GOVERNMENTAL AND INSTITUTIONAL ACCOUNTING** 3 credits
Prerequisites: 201 or 601, and either senior- or graduate-level standing. Theory and procedures involved in application of fund accounting, budgetary control, appropriations and various accounting systems to governmental units, educational, medical and other nonprofit institutions.
- 580 ACCOUNTING PROBLEMS** 3 credits
Prerequisite: 318. Independent research on advanced accounting problem in student's specific area of interest.
- 588 CPA PROBLEMS: AUDITING** 2 credits
Prerequisite: 440/540 or permission of instructor. Preparation for auditing section of CPA examination, focusing on auditing principles, standards and ethics and situations encountered by independent auditor.
- 589 CPA PROBLEMS: THEORY** 2 credits
Prerequisite: permission of instructor. Preparation for theory section of CPA examination, focusing on current developments and use of basic accounting theory to solve advanced accounting problems.
- 591 WORKSHOP IN ACCOUNTING** 1-3 credits
(May be repeated) Prerequisite: permission of instructor. Group study of accounting under faculty guidance. May not be used to meet undergraduate or graduate accounting major requirements, but may be used for elective credit only with permission of instructor or department.
- 601 FINANCIAL ACCOUNTING** 3 credits
Introductory course for student with no accounting background. Examines accounting principles as applied to financial problems of firm.
- 603 BUSINESS SYSTEMS WITH PROCESSING APPLICATIONS** 3 credits
Prerequisite: 601. Introduction to basic concepts in computer technology, steps in system development and logic of designing accounting systems by using a business-oriented language or related software.
- 610 ACCOUNTING MANAGEMENT AND CONTROL** 3 credits
Prerequisite: 601 or equivalent. Investigation of role of accounting as management tool in areas of production, marketing, internal control and capital budgeting with focus on management planning.
- 627 SURVEY OF FEDERAL TAXATION** 3 credits
Prerequisites: 601 or equivalent. Introduction to federal taxation for students who have not yet completed more than one undergraduate or graduate tax course. Examines individual and business federal taxation. Completion of this course will not count towards fulfilling the requirements of the Master of Taxation degree.
- 628 BASIC TAX RESEARCH** 1 credit
Prerequisites: 430 or equivalent. Designed to develop basic research competence involving federal income, estate, and gift tax laws.
- 631 CORPORATE TAXATION I** 3 credits
Prerequisite: 430. Detailed examination of tax problems of corporations and their shareholders. Formation, distribution, redemption, liquidation and penalty taxes covered.
- 632 TAXATION OF TRANSACTIONS IN PROPERTY** 3 credits
Prerequisite: 430. Explores federal tax implications of gains and losses derived from sales, exchanges and other dispositions of property.
- 633 ESTATE AND GIFT TAXATION** 3 credits
Prerequisite: 430. Analyzes provisions of federal estate and gift tax laws and tax consequences of testamentary and lifetime transfers.
- 637 ADVANCED ACCOUNTING THEORY** 3 credits
Prerequisite: 318. Examination of accounting concepts and standards through critical analysis of articles on current trends in profession. Discussion and outside research stressed.
- 640 ADVANCED AUDITING** 3 credits
Prerequisite: 440/540. Conceptual foundations and current research on professional and internal auditing. Includes government regulation and litigation, statistics, computer systems as well as current and prospective developments in auditing.
- 641 TAXATION OF PARTNERSHIPS AND S CORPORATIONS** 3 credits
Prerequisite: 430. Examines intensively provisions of subchapters K and S of Internal Revenue Code and uses of partnerships and subchapter S corporations for tax planning.

- 642 CORPORATE TAXATION II** 3 credits
Prerequisite: 631. Continuation of 631. Concludes study of subchapter C of Internal Revenue Code with major focus on corporate reorganization.
- 643 TAX ACCOUNTING** 2 credits
Prerequisite: 430. Attention focused on timing of income and expenses for individuals and businesses and its relation to tax planning.
- 644 INCOME TAXATION OF DECEDENTS, ESTATES AND TRUSTS** 2 credits
Prerequisite: 633. An in-depth examination of the decedent's last income tax return along with the analysis of income taxation of trusts and estates and their creators, fiduciaries and beneficiaries.
- 645 ADVANCED INDIVIDUAL TAXATION** 3 credits
Prerequisite: 430. In-depth study of some of the more involved areas of individual income taxation.
- 646 CONSOLIDATED TAX RETURNS** 2 credits
Prerequisite: 430. Intensive study of tax provisions concerning use of consolidated tax returns.
- 647 DEFERRED COMPENSATION** 3 credits
Prerequisite: 430. Nature, purpose and operation of various forms of deferred compensation examined with much emphasis on pension and profit-sharing plans.
- 648 TAX PRACTICE AND PROCEDURE** 2 credits
Prerequisite: 430. In-depth study of administration and procedures of Internal Revenue Service and responsibilities of tax practitioner.
- 649 STATE AND LOCAL TAXATION** 2 credits
Prerequisite: 631. Examines common types of taxes imposed by state and local governments and includes taxation of multistate businesses.
- 650 ESTATE PLANNING** 2 credits
Prerequisite: 430. Considers entire process of planning the estate with due regard for disposition of property, tax minimization, liquidity requirements and administrative costs.
- 651 UNITED STATES TAXATION AND TRANSNATIONAL OPERATIONS** 2 credits
Prerequisite: 430. Examines United States taxation of foreign income of domestic corporations, citizens and residents, as well as United States income of nonresident aliens and foreign corporations.
- 652 TAX-EXEMPT ORGANIZATIONS** 2 credits
Prerequisite: 430. Analysis of tax aspect of tax-exempt organizations, including nature of and limitations of its exemption.
- 653 BUSINESS PLANNING** 2 credits
Prerequisite: 631. Uses cases depicting complex problems to permit student to integrate knowledge of taxation.
- 654 INDEPENDENT STUDY IN TAXATION** 1-3 credits
Prerequisite: permission of instructor. Intensive study of particular topic or limited number of topics not otherwise offered in curriculum.
- 655 ADVANCED INFORMATION SYSTEMS** 3 credits
Prerequisites: 355 and 610. Advanced study of accounting information system theory, elements, principles, design and implementation. Practical data processing and networks to control flow of information.
- 656 NON-QUALIFIED EXECUTIVE COMPENSATION** 2 credits
Prerequisite: 631. Various non-qualified executive compensation items are analyzed. The tax effects to both the recipients and payor entities are determined and discussed.
- 661 ADVANCED TAX RESEARCH AND POLICY** 3 credits
Prerequisite: 628 and completion of four other tax courses in Phase II. Extensive research involving federal income, estate, trust and gift taxes as well as tax policy.
- 670 COST CONCEPTS AND CONTROL** 3 credits
Prerequisite: 6400:650 and either 6200:460 or 610. Focus on analysis and control of costs and their uses in decision making. Determination of cost data and efficiency of decision emphasized.
- 680 INTERNATIONAL ACCOUNTING** 3 credits
Prerequisite: 610. Examination of accounting theory and practice from international perspective with emphasis on multinational investment, business and auditing activities and reporting problems.
- 690 SEMINAR IN TAXATION** 3 credits
(May be repeated for a total of six credits.) Prerequisites: 430 or permission of instructor. Program of studies in the tax area of student's choice, in which a finished report is required.
- 693 SELECTED TOPICS IN TAXATION** 3 credits
(May be repeated for a total of six credits.) Prerequisites: 430 or permission of instructor. Provides study in contemporary issues in taxation that are not covered in current courses.
- 697 INDEPENDENT STUDY IN ACCOUNTING** 1-3 credits
(May be repeated for a total of three credits) Focus on special topics of study and research in accounting on an independent basis.
- 699 SEMINAR IN ACCOUNTING** 3 credits
(May be repeated for a total of six credits) Prerequisite: permission of instructor. Program of independent research in account area of student's choice, requiring submission of a finished report within a year.

FINANCE 6400:

- 591 WORKSHOP IN FINANCE** 1-3 credits
(May be repeated) Group studies of special topics. May not be used to meet undergraduate or graduate major requirements in finance. May be used for elective credit only with permission of instructor or department.
- 602 MANAGERIAL FINANCE** 3 credits
Prerequisites: 6200:201, 202 (or 601) and 3250: 201, 202 (or 600). Emphasis on financial decision making related to goal of firm; specifically, the investment decision, the financing decision and the dividend decision.
- 623 LEGAL ASPECTS OF BUSINESS TRANSACTIONS** 3 credits
(Not open to students with six credits of undergraduate business law) Study of the fundamental legal concepts that apply to business transactions, and the administration of a business.

- 633 MANAGEMENT OF DEPOSITORY FINANCIAL INSTITUTIONS** 3 credits
Prerequisite: 602 and 6500:602. Policy determination, administrative decision making in banks, savings and loans using computer simulation games.
- 645 INVESTMENT ANALYSIS** 3 credits
Prerequisite: 602 and 6500:602 or permission of instructor. Study of the economic and market forces that influence security prices. Techniques of analysis used in evaluating limited income and equity securities.
- 647 OPTIONS, FUTURES AND SPECULATIVE MARKETS** 3 credits
Prerequisites: 645, 6500:601. A study of the applications and practice in options, futures and other speculative markets.
- 649 PORTFOLIO MANAGEMENT** 3 credits
Prerequisite: 645 or permission of instructor. Advanced techniques used by sophisticated individuals, professional managers of large portfolios.
- 650 ADMINISTERING COSTS AND PRICES** 3 credits
Prerequisite: 3250:600 or equivalent. Provides an understanding of managerial economics. Short- and long-run decisions of firm analyzed. Analysis includes impact of costs and prices on business profitability.
- 655 GOVERNMENT AND BUSINESS** 3 credits
Prerequisites: 3250:600 and 6500:600. Public policy with regard to business institutions and issues are considered from an economic, legal, ethical, political framework.
- 674 FINANCIAL MANAGEMENT AND POLICY** 3 credits
Prerequisite: 602 and 6500:602. Working capital management, controlling inventory, investments, administering costs and funds, managing investment in plant and equipment, administering business income and forecasting for financial management.
- 676 MANAGEMENT OF FINANCIAL STRUCTURE** 3 credits
Prerequisite: 674. Emphasizes determination of volume and composition of sources of funds. Primary attention directed to cost of capital for specific sources of financing.
- 678 CAPITAL BUDGETING** 3 credits
Prerequisite: 674. Attempt to integrate various theories of capital budgeting into comprehensive conceptual scheme. Theoretical concepts and practical applications blended for better understanding of capital problems.
- 681 INTERNATIONAL BUSINESS FINANCE** 3 credits
Prerequisite: 602 or equivalent. Financial policies and practices of companies involved in multinational operations. Considers management of working capital and permanent assets, return on investment and capital budgeting for the global firm.
- 680 SELECTED TOPICS IN FINANCE** 3 credits
(May be repeated for a total of six credits) Prerequisite: 674. Provides study of contemporary issues and areas not covered in current finance graduate courses.
- 682 COLLOQUIUM IN BUSINESS** 3 credits
Prerequisite: permission of graduate director. Study of business administration through a seminar of several lecturers in business research and practice. A broad range of topics in business research and issues will be discussed by guests, faculty and graduate students. May be repeated, but will not satisfy degree requirements. (Credit/non credit.)
- 687 INDEPENDENT STUDY IN FINANCE** 1-3 credits
(May be repeated for a total of three credits) Focus on special topics of study and research in finance on an independent basis.
- 688 INDEPENDENT STUDY: BUSINESS LAW** 1-3 credits
Focus on special topics of study and research in the legal aspects of business administration.
- 689 SEMINAR IN FINANCE** 3 credits
(Must be repeated for a total of six credits) Prerequisites: 674 and a total of 15 Phase II graduate credits. Program of independent research in finance area of student's choice, requiring submission of a finished research report.
- 582 HEALTH SERVICES OPERATIONS MANAGEMENT** 3 credits
Prerequisites: upper-college standing and 301 or 480 and 322 and 323 or equivalents or graduate standing and 580 or 600 or equivalent and 601 or 602 or equivalents or permission of instructor. (Students who have completed 331 are ineligible to take this course for credit). Application of production and operations management concepts and techniques in health services organizations.
- 585 SPECIAL TOPICS IN HEALTH SERVICES ADMINISTRATION** 1-3 credits
Prerequisite: permission of instructor. Special topics in health services administration (e.g., management) focusing on historical and/or contemporary managerial organizational and/or policy/strategy issues as related to health-care organizations and health-care systems. Separate topics may be repeated for a maximum of six credits. For those registered for graduate credit, a major research paper is required.
- 600 MANAGEMENT AND PRODUCTION CONCEPTS** 3 credits
Quantitative, behavioral, systems approach to introduce management process, emphasizing production function. Designed for student who has not previously had courses in business.
- 601 QUANTITATIVE DECISION MAKING** 3 credits
Prerequisite: finite mathematics. Applies quantitative techniques to business decision making. Topics covered include probability estimation and hypothesis testing, simple and multiple regression and correlation analysis, analysis of variance and nonparametric statistics.
- 602 COMPUTER TECHNIQUES FOR MANAGEMENT** 3 credits
Introduction to the use of integrated spreadsheet software, database management software and the analysis and design of management information systems.
- 640 MANAGEMENT INFORMATION SYSTEMS** 3 credits
Prerequisite: 602 or equivalent. An introduction to systems design, management information systems, data base management; their relationships to problem solving and the organization. Cannot be taken in lieu of 6200:655.
- 641 APPLIED DATA MANAGEMENT** 3 credits
Prerequisite: 602. An in-depth examination of the treatment of data, from collection through organization and storage to data extraction and manipulation, including uses of online databases.
- 642 SYSTEMS SIMULATION** 3 credits
Prerequisite: 601, 602. Manufacturing or service sector systems are analyzed and modeled on a computer. Experimental designs, statistical significance of results, model verification and validation will be discussed.
- 643 EXPERT-SYSTEMS IN BUSINESS** 3 credits
Prerequisite: 641. Introduction to artificial intelligence in general and expert systems. Course provides hands-on experience in designing systems for business applications using engineering tools software.
- 644 MANAGERIAL DECISION SUPPORT SYSTEMS** 3 credits
Prerequisites: 6500:641. Examines decision support systems as an analytical tool in the current business environment. Business problems are analyzed and a DSS is designed and implemented.
- 645 ADVANCED MANAGEMENT INFORMATION SYSTEMS** 3 credits
A case-oriented course which examines the problems of managing the Corporate Information Systems activity as regarded by users, general management and IS management. Cannot be taken in lieu of 6200:655.
- 651 PRODUCTIVITY AND QUALITY OF WORKLIFE ISSUES** 3 credits
Prerequisite: 652 or permission of instructor. A comprehensive study of innovations in organizations designed to increase human satisfaction and productivity through changes in human management.
- 652 ORGANIZATIONAL BEHAVIOR** 3 credits
Prerequisite: 600 or equivalent. Study of factors which influence human behavior in business organizations. Emphasis on theories of individual and group behavior, motivation, leadership and communication in organizations.
- 653 ORGANIZATIONAL THEORY** 3 credits
Prerequisite: 652. Leadership styles in organized institutional setting; influence of these styles on individual, group behavior; organizational goal attainment. Analysis of leader's role in administrative process.
- 654 INDUSTRIAL RELATIONS** 3 credits
Prerequisite: 600. Study of rights and duties of management in dealing with labor and economic consequences of union and management policies and practices.
- 655 COMPENSATION ADMINISTRATION AND EMPLOYEE BENEFITS** 3 credits
Prerequisite: 600. A comprehensive approach toward the identification and resolution of pay and benefit problems facing business organizations in their internal and external labor markets.
- 656 MANAGEMENT OF INTERNATIONAL OPERATIONS** 3 credits
Prerequisite: 652 or equivalent. Deals with institutional environment of international business; parameters of international business system which hold the system together and which individual business people cannot materially alter.
- 657 THE LEADERSHIP ROLE IN ORGANIZATIONS** 3 credits
Prerequisite: 652. Analysis and development of leadership theory and thought. Identification of leaders in both formal and informal organizations. Training and development methods for leaders evaluated. Individual and small group field study assignments.
- 656 STRATEGIC HUMAN RESOURCES MANAGEMENT** 3 credits
Prerequisites: 600, 652, 654. The formulation, design and implementation of strategic human resource practices and systems for business organizations. Emphasis is on competitive cost advantages and productivity gains.
- 659 OPERATIONS AND STRATEGIC PLANNING** 3 credits
Prerequisites: 600, 601, 602 or equivalent. Long-range and short-term planning in organizations and linkage between the two. Planning models are presented of business and nonprofit organizations.
- 660 EMPLOYMENT DISCRIMINATION** 3 credits
Prerequisite: 652 or equivalent. An overview of discrimination procedures and prohibitions, affirmative action requirements, employee and employer disclosure and their application in human resources management.
- 662 QUANTITATIVE METHODS — OPERATIONS MANAGEMENT** 3 credits
Prerequisite: 601 or equivalent. Survey of basic techniques of operations research. Stresses application to functional areas of business with particular emphasis given to production and planning aspects.
- 663 APPLIED INDUSTRIAL STATISTICS I** 3 credits
Prerequisite: 601 or equivalent. Designs for survey sampling and estimation. Simple linear regression analysis, including inferences, aptness of the model and joint confidence intervals.
- 664 APPLIED INDUSTRIAL STATISTICS II** 3 credits
Prerequisite: 663. Applications of multiple regression including determining "best" set of independent variables, correlation models, analysis of variance models including multifactor models. Experimental designs including randomized block and Latin square designs.

MANAGEMENT

6500:

- 508 ENTREPRENEURSHIP** 3 credits
Prerequisites: upper-college or graduate standing and 301 or 600 or equivalent. Examines the behavior and environment for entrepreneurship. Focuses on classic and contemporary entrepreneurs and the importance of personal values and strategies. Case studies. Field projects.
- 510 SELECTED TOPICS IN ENTREPRENEURSHIP** 1-3 credits
Prerequisites: upper-college or graduate standing and 301 or 600 or equivalent. Facilitates comparative international study of entrepreneurship, introduction of entrepreneurship to large organizations, or application of student's entrepreneurial skills. Six hour limit.
- 512 DEVELOPMENT OF MANAGEMENT THOUGHT** 3 credits
Prerequisites: upper-college or graduate standing and 301, or 600 or equivalent. Review of development of managerial theories from 5000 B.C. to present with consideration of their application to present organizational settings.
- 555 MANAGEMENT OF ARBITRATION: COMMERCIAL, INTERNATIONAL AND HUMAN RESOURCES** 3 credits
Prerequisites: upper-college or graduate standing and 301 or 600 or equivalent. A comprehensive study of managerial strategies for commercial, international and human resource arbitration. Graduate requirement: research paper.
- 571 MANAGEMENT PROBLEMS** 3 credits
(Student who has earned credit in 471 is ineligible to register for or earn credit in 472, 473.) Prerequisites: 332 or 342 or 443 and senior standing. Student applies modern management principles, practices, theory to an actual problem in industry.
- 560 INTRODUCTION TO HEALTH-CARE MANAGEMENT** 3 credits
Prerequisites: upper-college or graduate standing (Students who are required to take 301 or 600 or have completed 301 or 600 or equivalent are ineligible to take this course for credit). Introductory course for health professionals providing in-depth study of management and principles and concepts as applied to particular health-care organizations and health-care delivery system. Topics covered include (a) physical resource management, (b) human resource management including motivation, leadership, supervision, communication practices, work group dynamics with emphasis on managing health-care professionals and resources of health-care organization, and (c) principles and techniques of decision making, planning, organizing and controlling in health-care setting. For those registered for graduate credit, a major research paper is required.

- 671 ADVANCED OPERATIONS RESEARCH** 3 credits
Prerequisite: 662. Designed to present in more depth and breadth certain topics surveyed in 662, with emphasis on application of these techniques to student's own business situations.
- 672 MANUFACTURING AND OPERATIONS ANALYSIS** 3 credits
Prerequisite: 601 or equivalent. Provides an applications forum where skills gained in other manufacturing — quantitative areas of curriculum can be empirically utilized and applied.
- 673 QUALITY AND PRODUCTIVITY TECHNIQUES** 3 credits
Prerequisite: 601. Introduction to techniques for improving productivity and quality, including statistical process control (SPC), material requirements planning (MRP), just-in-time (JIT) inventory control and management of the program.
- 674 ADVANCED QUALITY AND PRODUCTIVITY TECHNIQUES** 3 credits
Prerequisite: 673. Examines advanced techniques in statistical process control, experimental design, determination of customer quality needs/customer service, product reliability/liability and management of quality systems.
- 675 MATERIALS MANAGEMENT** 3 credits
Prerequisite: 600. Surveys functions and explores opportunities for profit improvement and cost reduction in those functions integrated under the organizational concept of materials management.
- 676 MANAGEMENT OF PRODUCTION AND OPERATIONS** 3 credits
Prerequisites: 600, 602, 662. Surveys the management of resources required to transform inputs into products or services. Addresses issues related to services, materials, people and equipment utilized for production.
- 678 PROJECT MANAGEMENT** 3 credits
Provides working knowledge of tools and methods available to project managers including computerized analysis of network models to aid in the planning and control functions.
- 683 HEALTH SERVICES SYSTEMS MANAGEMENT** 3 credits
Prerequisite: 580 or 600 or equivalent or permission of instructor. Study of health services organizations, comparative delivery systems, the roles of third-party payors and government policy in health care. Seminar format: major research paper required.
- 686 HEALTH SERVICES RESEARCH PROJECT** 3 credits
Prerequisites: 580 or 600 or equivalent and 582 and co-requisite 683 or permission of instructor. In-depth field study in health services administration with applications of research and analysis skills. Course requires review of literature and a major research paper.
- 687 GRADUATE SEMINAR IN HEALTH SERVICES POLICY AND ADMINISTRATION** 3 credits
Prerequisites: 580 or 600 or equivalent and 582 and co-requisite 683 or permission of instructor. Advanced seminar; in-depth study of contemporary issues in health services policy and administration. Includes examination of macro-social and micro-organizational issues. Major paper required.
- 688 INDEPENDENT STUDY IN HEALTH SERVICES ADMINISTRATION** 1-3 credits
(May not be repeated for more than three credits) Prerequisites: 580 or 600 or equivalent and 683 or permission of instructor. Independent study and research of a special topic of interest in health services administration (e.g., management), chosen by the student in consultation with and under the supervision of the instructor.
- 690 SELECTED TOPICS IN MANAGEMENT** 3 credits
(May be repeated for a total of six credits) Prerequisite: 652. Selected topics in historical, contemporary and/or operational and functional areas of management.
- 695 BUSINESS STRATEGY AND POLICY: DOMESTIC AND INTERNATIONAL** 3 credits
Prerequisite: to be final course in M.B.A. program. A case-oriented course which focuses on integration of theoretical and practical knowledge acquired in core business courses. Students analyze, evaluate, formulate organization objectives and strategies within domestic and international environmental contexts.
- 697 INDEPENDENT STUDY IN MANAGEMENT** 1-3 credits
(May be repeated for a total of three credits) Focus on special topics of study and research in management on an independent basis.
- 699 GRADUATE SEMINAR IN MANAGEMENT** 3 credits
(May be repeated for a total of six credits) Prerequisite: total of 15 Phase II graduate credits. For master's degree candidate in management. Independent study and reading. Leads to finished paper which should be completed within one year from time of enrollment in course.

MARKETING

6600:

- 520 LOGISTICS SYSTEMS ANALYSIS** 3 credits
Prerequisite: 320. Stresses application of quantitative techniques in design and operation of individual logistics components as well as integration of total logistics system in the firm. Emphasis on student's evaluation and solving of logistics problems.

- 540 PRODUCT PLANNING** 3 credits
Prerequisite: 300. In-depth study of tools and techniques involved in new product development process and management of the product through its life cycle. Emphasis on alternative forms of corporate structures for product development and management, product policies and strategies, and product planning procedures and techniques. Differences between consumer and industrial products.
- 565 FORECASTING AND QUANTITATIVE METHODS IN MARKETING** 3 credits
Prerequisites: 460, 620. Explores the more sophisticated quantitative and forecasting methods, tools, procedures available to marketing researchers, decision makers; how these are applied to marketing problems.
- 600 MARKETING CONCEPTS** 3 credits
Assessment of basic marketing principles involved in business and industry. Required of all non-business undergraduates; may not be selected for Phase II credit.
- 620 STRATEGIC MARKETING MANAGEMENT** 3 credits
Prerequisite: 600 or equivalent. Managerial assessments of opportunities, threats are explored as are the development and management of appropriate strategic marketing plans and their tactical implementation.
- 640 MARKETING INFORMATION SYSTEMS AND RESEARCH** 3 credits
Prerequisites: 620, 6500:601, 602. Explores managerial development and maintenance of systematic methods for locating, acquiring, processing, analyzing and utilizing marketing information for marketing decision making.
- 650 CONSUMER BEHAVIOR** 3 credits
Prerequisite: 620. Methods of identifying and analyzing final industrial and institutional markets are explored. Focus is placed upon theoretical models, research tools, appropriate marketing responses.
- 655 MARKETING COMMUNICATIONS** 3 credits
Prerequisite: 620. Total range of marketing communication tools are examined individually, in the context of the planning, development and implementation of systematic marketing communications programs.
- 680 MARKETING THEORY** 3 credits
Prerequisite: 620. Designed to apply those theoretical works from areas of economics, psychology, sociology and cultural anthropology which have relevance to a general theory of marketing.
- 697 INDEPENDENT STUDY IN MARKETING** 1-3 credits
(May be repeated for a total of three credits) Focus on special topics of study and research in marketing on an independent basis.
- 699 SEMINAR IN MARKETING** 3 credits
(May be repeated for a total of six credits) Prerequisite: a total of 15 Phase II graduate credits. Capstone course permits M.B.A. candidate to undertake a carefully delineated program of independent study and reading which leads to a finished major paper.

INTERNATIONAL BUSINESS

6800:

- 605 INTERNATIONAL BUSINESS ENVIRONMENTS** 3 credits
An introductory course designed to develop a broad understanding of global business environments.
- 630 INTERNATIONAL MARKETING POLICIES** 3 credits
Prerequisite: 6600:620 and 6800:605 or permission of instructor. Explores the problems of formulating and implementing marketing strategies and tactics within complex and changing multinational organizations and international markets. A planning framework is emphasized.
- 685 MULTINATIONAL CORPORATIONS** 3 credits
Prerequisite: 605. An advanced course designed to develop an in-depth understanding of global businesses, their functions, structures, and strategic operations.
- 690 SEMINAR IN INTERNATIONAL BUSINESS** 3 credits
Prerequisite: 605 and a total of 15 Phase II graduate credits or permission of instructor. Advanced course covering several major issues in international business.
- 697 INDEPENDENT STUDY IN INTERNATIONAL BUSINESS** 1-3 credits
(May be repeated for a total of three credits) Prerequisites: Graduate standing and permission of instructor. Focus on special topics of study and research in international business on an independent basis.

College of Fine and Applied Arts

ART 7100:

- 500 ART IN THE UNITED STATES BEFORE WORLD WAR II** 3 credits
Prerequisite: 101 or permission of instructor. Consideration of development of art in the United States from earliest evidences to approximately World War II.
- 505 HISTORY OF ART SYMPOSIUM** 1-3 credits
(May be repeated for credit when a different subject is indicated) Prerequisite: one art history course beyond 100.1 or permission of instructor. Lecture, individual research and evaluation, group discussion related to a specific time period or to an artistic problem.
- 590 WORKSHOP IN ART** 1-4 credits
(May be repeated for credit when a different subject or level of investigation is indicated—490 to maximum of eight credits; 590 to maximum of 12 credits) Prerequisite: advanced standing in art or permission of instructor. Group investigation of a particular phase of art not offered by other courses in curriculum.
- 591 ARCHITECTURAL PRESENTATIONS I** 3 credits
Prerequisites: Junior level or permission. Studio practice in architectural design and presentation methods in residential and commercial interiors.
- 592 ARCHITECTURAL PRESENTATIONS II** 3 credits
Prerequisites: 491/591. Continuation of concepts covered in Architectural Presentations I with additional work in color rendering techniques. Emphasis on a variety of rendering mediums.
- 597 INDEPENDENT STUDIES** 1-3 credits
(May be repeated) Prerequisites for art majors: advanced standing in area chosen and permission of instructor. Prerequisite for non-art majors: permission of instructor. Investigation in depth of aesthetic and technical problems within a studio-selected area of specialization. Student must present in writing a proposed study plan and time schedule for instructor approval.
- 598 SPECIAL PROBLEMS IN HISTORY OF ART** 1-3 credits
(May be repeated for credit when a different subject or level of investigation is indicated) Prerequisites: 20 credits in art history and permission of instructor and department head. Individual research in art history centered around limited topic, such as specific time period, history of specific techniques, a single artist or movement in art history. No more than 10 credits will be counted toward major.

HOME ECONOMICS AND FAMILY ECOLOGY 7400:

- 501 FAMILY-LIFE PATTERNS IN THE ECONOMICALLY DEPRIVED HOME** 2 credits
Study of family life orientation and life-style patterns among economically deprived with emphasis on impact or socioeconomic and psychological deprivation on family members throughout family life span.
- 503 ADVANCED FOOD PREPARATION** 3 credits
Prerequisite: 141 or 245 or permission of instructor. Study of advanced techniques of food preparation. Introduction to and interpretation of classic and foreign cuisines. Emphasis on individualized experience, skill development and evaluation of procedures and results.
- 504 ADOLESCENCE IN THE FAMILY CONTEXT** 3 credits
Prerequisites: 201, 265 or permission of instructor. The influences of adolescent behavior on the family and the influence of the family environment on adolescent development.
- 506 FAMILY FINANCIAL MANAGEMENT** 3 credits
Analysis of the family as a financial unit including financial problems and their resolution, decision-making patterns and financial practices behavior. Cases, exercises, problems and computer analysis.
- 518 HISTORY OF FURNISHINGS & INTERIORS I** 3 credits
Study of furnishings and interiors from antiquity through the eighteenth century, with emphasis on the social-cultural influences shaping their development.
- 519 HISTORY OF FURNISHINGS AND INTERIORS II** 3 credits
Study of nineteenth and twentieth century furnishings and interiors, with emphasis on the social-cultural influences shaping their development.
- 520 EXPERIMENTAL FOODS** 3 credits
Prerequisites: 246, 3150:130. Theory and methods in the experimental study of foods. Sensory evaluation and instrumental analysis of food quality. Individual research emphasized. Lecture/Laboratory.
- 523 PROFESSIONAL IMAGE ANALYSIS** 3 credits
Prerequisites: Senior status. Comparison of theories associated with projecting and maximizing an appropriate professional image consistent with career goals and objectives.
- 524 NUTRITION IN THE LIFE CYCLE** 3 credits
Prerequisite: 316 or permission of instructor. Study of the physiological basis for nutritional requirements; interrelating factors which affect growth, development, maturation and nutritional status from conception through the elderly years.
- 532 INTERIOR TEXTILES AND PRODUCT ANALYSIS** 3 credits
Prerequisite: 158. Examination, evaluation, and analysis of products for interiors with emphasis on trade classifications, selection criteria, economic factors, and legislative concerns.
- 533 RESIDENTIAL DESIGN** 3 credits
Prerequisites: 158, 7100:282. A study of interior design as applied to residential aspects with emphasis on conceptual, analytical, and graphic skills.
- 534 COMMERCIAL DESIGN** 3 credits
Prerequisite: 158, 7100:282. A study of interior design as applied to commercial aspects with emphasis on conceptual, analytical, and graphic skills.
- 535 PRINCIPLES AND PRACTICES OF INTERIOR DESIGN** 3 credits
Prerequisite: 158 and 433 or 434. Study of the business aspect of interior design; business procedures, manufacturing of home furnishings and principles and psychology of marketing home furnishings.
- 536 TEXTILE CONSERVATION** 3 credits
Prerequisites: 121, 123, 317. Principles and practices of textile conservation with emphasis on procedures appropriate for collectors and small historical agencies.
- 539 FASHION ANALYSIS** 3 credits
Prerequisite: 239. In-depth study of resources and processes for the analysis and forecasting of fashion trends. Emphasizes fashion theory, its application in fashion forecasting, and influential designers.
- 540 FAMILY CRISIS** 3 credits
Study of family stress and crisis including internal and external variables and their influence on degree of disorganization, coping and recovery. Includes theory, research and application dimensions.
- 542 HUMAN SEXUALITY** 3 credits
Prerequisite: 201 or permission of instructor. Introduction to problems and values. Emphasis is on the role of values in intimate relationships, the diverse dimensions of sexual responsibility.
- 545 PUBLIC POLICY AND THE AMERICAN FAMILY** 3 credits
How legislation in such areas as housing, clothing, consumer affairs, family formation and dissolution, resource conservation, child development and health care affects and, in some cases, determines the nature, structure and quality of the family as a social institution.
- 546 CULTURE, ETHNICITY AND THE FAMILY** 3 credits
Study of the role of culture and ethnicity in adaptation of the family system to environment. Program applications considered.
- 548 BEFORE AND AFTER SCHOOL CHILD CARE** 2 credits
Study of the development, implementation and evaluation of school-age child-care programs for before and after school and vacation periods.
- 551 CHILD IN THE HOSPITAL** 4 credits
Prerequisite: 265, comparable course or permission of instructor. Seminar dealing with special needs and problems of hospitalized/ill child and family. Literature related to effects, separation, illness and stress. Examination of strategies for coping.
- 555 PRACTICUM: ESTABLISHING AND SUPERVISING A CHILD-LIFE PROGRAM** 3 credits
Prerequisite: 451/551. Explores procedures for implementing and setting up child-life programs; critical analysis of currently functioning program.
- 560 ORGANIZATION AND SUPERVISION OF CHILD-CARE CENTERS** 3 credits
Theory, principles and procedures involved in establishing and operating centers for infants, toddlers, preschool and school-age children.
- 570 THE FOOD INDUSTRY: ANALYSIS AND FIELD STUDY** 3 credits
Prerequisite: 245 or permission. Role of technology in extending the food supply. Chemical, physical and biological effects of processing and storage, on-site tours of processing plants.
- 574 CULTURAL DIMENSIONS OF FOOD** 3 credits
An examination of cultural, geographical and historical influences on development of food habits. Emphasis on evolution of diets; effects of religion, education, gender roles, media.
- 575 ANALYSIS OF FOOD** 3 credits
Prerequisites: 3150:130 and 7400:245. Theory and practice of food analysis by classical and modern chemical and instrumental methods. Principles illustrated by experimentation and demonstration.
- 576 DEVELOPMENTS IN FOOD SCIENCE** 3 credits
Prerequisite: 246. Advanced study of the chemistry and physics of food components, affecting characteristics of foods. Critical evaluation of current basic and applied research emphasized.
- 580 COMMUNITY NUTRITION I — LECTURE** 3 credits
Corequisite: 481 for CUP students only. Major food and nutrition related problems in the community. Emphasis on community assessment, program implementation and evaluation, and rationales for nutrition services.
- 581 COMMUNITY NUTRITION I — CLINICAL** 1 credit (credit/noncredit)
Prerequisite: CUP students only; 380, 428. Corequisite: 480/580. Field placement in area agencies offering nutrition services. Study of the agency's goals, organization, and philosophy of nutritional care.
- 582 COMMUNITY NUTRITION II — LECTURE** 3 credits
Prerequisite: 480. Corequisite: 483 for CUP students only. Activities engaged in by community nutritionist. Emphasis on controversies, cultural differences, educational approaches, grantmanship, marketing, and working with the media.
- 583 COMMUNITY NUTRITION II — CLINICAL** 1 credit (credit/noncredit)
Prerequisite: CUP students only; 481/581. Corequisite: 482/582. A second field placement in an area agency offering nutrition services. Study of the agency's goals, organization, and philosophy of nutritional care.
- 584 ORIENTATION TO THE HOSPITAL SETTING** 2 credits
Prerequisite: 265, comparable course or permission of instructor. Focuses on hospital as a major social institution; introduces procedures and functions of the hospital; roles played by various hospital personnel plus cursory knowledge of medical terminology, common childhood diseases, illnesses and injuries.
- 585 SEMINAR IN HOME ECONOMICS** 1-3 credits
Prerequisite: permission of instructor. Exploration and evaluation of current developments in selected areas.
- 587 SPORTS NUTRITION** 3 credits
Prerequisites: 133; 3100:207; 3150:130 or 203 or permission of instructor. In-depth study of energy metabolism and utilization before, during, and after exercise. Factors affecting nutrient needs and peak performance of different athletic populations are emphasized.
- 588 PRACTICUM IN DIETETICS** 1-3 credits
Prerequisite: approval of advisor/instructor. Practical experience in application of the principles of nutrition.
- 590 WORKSHOP IN HOME ECONOMICS AND FAMILY ECOLOGY** 1-3 credits
Prerequisite: at least junior standing. Investigation on current issue or topic in selected areas of home economics and family ecology. May be on off-campus study tour or an on-campus full-time group meeting.

MUSIC

7500:

- 596 PARENTING SKILLS** 3 credits
Prerequisite: 265, comparable course or permission of instructor. Reviews and analyzes various child-rearing techniques with major emphasis on practical application.
- 600 EVALUATION OF HOME ECONOMICS LITERATURE** 3 credits
A study of selected literature with emphasis upon evaluation and interpretation strategies.
- 601 FAMILY IN TRANSITION** 2 credits
Overview of family in historical perspective. Effects of social change upon family and emerging relational patterns. Review of theory, research and educational strategies.
- 602 FAMILY IN LIFE-SPAN PERSPECTIVE** 2 credits
Study of individual and family development across life span. Emphasis on management of available resources, adjustment patterns and interpersonal competence. Implications for education, theory, research and social policy.
- 603 FAMILY: MIDDLE AND LATER YEARS** 2 credits
Study of family patterns and problems during middle and later years of life with emphasis on psychological and biological changes and economic and social adequacy. Research and trends in gerontology.
- 605 DEVELOPMENTAL PARENT-CHILD INTERACTIONS** 3 credits
Prerequisite: 265 or equivalent or permission. Study of reciprocal interactions formed between parent and child from birth to adulthood. Consideration of cross-cultural studies, historical and societal influences and varying family characteristics and structures.
- 607 FAMILY DYNAMICS** 3 credits
Development of techniques in home economics programs utilizing role theory, exchange theory and systems theory as understood through the study of the family across the life cycle.
- 610 CHILD DEVELOPMENT THEORIES** 3 credits
A comparative study of developmental theories of the child within the family context. Application of the theories to child rearing in the family will be emphasized.
- 616 INFANT AND CHILD NUTRITION** 2 credits
Emphasizes current research trends in physiology of infant and young child in relation to nutritional requirements and feeding practices.
- 624 ADVANCED HUMAN NUTRITION I** 3 credits
Prerequisite: 316 or equivalent. In-depth study of human nutrition emphasizing metabolism, physiological functions, and interrelationships of carbohydrate, protein and lipids and the determinants of human energy requirements.
- 625 ADVANCED HUMAN NUTRITION II** 3 credits
Prerequisite: 624 or equivalent. In-depth study of human nutrition with an emphasis in the utilization, physiological functions and interrelationships of vitamins and minerals.
- 631 PROBLEMS IN DESIGN** 1-3 credits
(May be repeated, but no more than 6 credits will apply to M.A.) Prerequisite: written proposal approved by faculty adviser. Individual solution of a specific design problem within the student's area of clothing, textiles and interior specialization.
- 632 AMERICAN COSTUME AND TEXTILE HERITAGE** 3 credits
Prerequisite: 317. Analysis of historic American costumes and textiles with emphasis on the cultural events that shaped their unique development.
- 640 NUTRITION IN DIMINISHED HEALTH** 3 credits
Prerequisite: 428 or permission. An examination of concepts related to nutritional intervention associated with selected pathophysiological and debilitating conditions throughout the life cycle. Emphasis on current literature.
- 851 FAMILY AND CONSUMER LAW** 3 credits
Study of laws which control and protect individuals within family. Emphasis on current trends, legal rulings. Course taught by attorney.
- 652 PROFESSIONAL PRESENTATION IN HOME ECONOMICS** 3 credits
Developing effective home economics professional presentations. Emphasis on visuals, display, demonstrations, public relations materials, user manuals, conference management, portfolio development, and learning styles.
- 660 PROGRAMMING FOR CHILD-CARE CENTERS** 2 credits
Principles, procedures involved in program development for child-care centers. Examination of current programs available for preschool children. Implications, literary analysis, application, evaluation stressed.
- 665 DEVELOPMENT IN INFANCY AND EARLY CHILDHOOD** 3 credits
Analysis of research and theoretical frameworks regarding infant and child development from conception through age five. Implications for guidance and education.
- 675 CONCEPTUAL FRAMEWORKS IN FAMILY ECOLOGY** 3 credits
The ecosystem will be used as a model for viewing the family as a unit and the relation between familial groups and the environment.
- 677 SOCIAL PSYCHOLOGY OF DRESS AND THE NEAR ENVIRONMENT** 3 credits
Study of dress and the near environment as they relate to human behavior at the micro and macro level.
- 694 MASTER'S PROJECT** 5 credits
Prerequisite: Permission of adviser. The development, implementation and evaluation of a community-based supervised project which makes a significant contribution to the field and may lead to publication.
- 695 INTERNSHIP IN HOME ECONOMICS AND FAMILY ECOLOGY** 5 credits
Prerequisite: permission of adviser. Community-based experience designed to supplement classroom studies. A student works with agency personnel and clientele in programs designed to meet needs of children and/or families.
- 696 INDIVIDUAL INVESTIGATION IN HOME ECONOMICS AND FAMILY ECOLOGY** 1-3 credits
Prerequisite: permission of adviser. Individual investigation and analysis of a specific topic in student's area of specialization of interest under direction of a faculty adviser.
- 697 INDIVIDUAL INVESTIGATION IN FAMILY DEVELOPMENT** 1-3 credits
Prerequisite: permission of graduate adviser only. Individual pursuit and analysis in specific area of student's interest and design under direction of faculty adviser.
- 698 INDIVIDUAL INVESTIGATION OF CHILD DEVELOPMENT** 1-3 credits
Prerequisite: permission of graduate adviser only. Individual pursuit and analysis in specific area of student's interest and design under direction of faculty adviser.
- 699 THESIS** 5 credits
Prerequisite: permission of adviser. Preparation of thesis pertaining to a selected research project in area of family or child development.
- 526 GRADUATE MUSIC THEORY REVIEW** 2 credits
Prerequisite: Undergraduate music theory equivalent to four semesters. Review of basic music theory concepts. Coverage includes the chromatic harmony vocabulary of the 18th, 19th, and 20th centuries.
- 527 GRADUATE MUSIC HISTORY REVIEW** 2 credits
Prerequisite: Undergraduate music history equivalent to four semesters of music history or literature study. Review of basic music history for graduate students. Coverage extends from antiquity to the present. Both reading and listening assignments will be required.
- 532 TEACHING AND LITERATURE: PERCUSSION INSTRUMENTS** 2 credits
To train undergraduate and graduate percussion students in techniques of percussion education. Emphasis on research, literature, performance, and techniques from elementary through secondary levels.
- 551 INTRODUCTION TO MUSICOLOGY** 2 credits
Prerequisite: 352. Comparative musicology; acoustics; psychology and physiology of music; aesthetics; theory of music theory; historical musicology.
- 553 MUSIC SOFTWARE SURVEY AND USE** 2 credits
Prerequisite: 152 or permission of instructor. A survey and evaluation of available software in the various forms of musical instruction. Students will design a course suitable for submission to a programmer.
- 555 ADVANCED CONDUCTING: INSTRUMENTAL** 2 credits (30 clinical hours)
Baton techniques and problems relating to practice, reading and preparation of scores; organization of ensembles; programming; conducting large instrumental ensembles. One hour lab required.
- 556 ADVANCED CONDUCTING: CHORAL** 2 credits
Prerequisite: 361 or equivalent. Conducting techniques to the choral ensemble, including leadership, error detection, tonal development, stylistic accuracy and analysis. One hour lab required.
- 562 REPERTOIRE AND PEDAGOGY: ORGAN** 3 credits
Prerequisite: permission of instructor. Survey of organ literature of all eras and styles, and of methods of teaching organ, applying principles to literature.
- 563 REPERTOIRE AND PEDAGOGY: STRING INSTRUMENTS** 3 credits
Prerequisite: permission of instructor. Study in depth of the four bowed string instruments, their teaching and close relationship. Despite obvious difference in physical application of cello and bass from violin and viola, methods of bowing, sound production and coloring are closely related. Application of the instruments to solo, chamber and orchestral playing.
- 567 GUITAR PEDAGOGY** 2 credits
Prerequisite: permission of instructor. A systematic analysis of prevailing schools of guitar pedagogy. Sound production physiology, method books and special problems in teaching addressed.
- 568 GUITAR ARRANGING** 2 credits
Prerequisite: permission of instructor. After comparative analyses of selected examples, students make original solo guitar arrangements of works written for other solo instruments and ensembles.
- 569 HISTORY AND LITERATURE OF THE GUITAR AND LUTE** 2 credits
Prerequisite: permission of instructor. Study of plucked, fretted, string instruments from the 14th Century to the present: construction, notation, literature and performance practices. Modern editions and recordings evaluated.
- 590 WORKSHOP IN MUSIC** 1-3 credits
Prerequisite: permission of instructor. Investigation of topics not offered in regular curriculum. Graduate student must fulfill additional requirements.
- 601 CHORAL LITERATURE** 2 credits
Prerequisite: permission of instructor. Study in depth of style, structure, technical demands, manner of setting text, and special performance problems found in masterworks by great choral composers of nine centuries.
- 604 DEVELOPMENT OF OPERA** 2 credits
Prerequisite: permission of instructor. Growth and development of opera from 1600 to present. Includes detailed examination of stylistic and structural changes as well as performance practices.
- 608 SEMINAR IN MUSIC OF THE WESTERN HEMISPHERE** 2 credits
Prerequisite: permission of instructor. Designed to develop understanding of peoples and cultures of Western Hemisphere through study of music of each major area. Research and writing in areas of special interest.
- 609 PEDAGOGY OF JAZZ IMPROVISATION** 3 credits
A detailed study of the methods and materials as they relate to the teaching of jazz improvisation.
- 611 FOUNDATIONS AND PRINCIPLES OF MUSIC EDUCATION** 3 credits
Prerequisite: permission of instructor. Study of basic philosophical, historical, sociological and psychology concepts around which public school music programs function.
- 612 PRACTICES AND TRENDS IN MUSIC EDUCATION** 3 credits
Prerequisite: permission of instructor. In-depth exploration of innovative practices and trends in music education. Findings of research and practice related to prevailing situations in public/private school programs.
- 613 INSTRUCTIONAL PROGRAMMING IN MUSIC FOR THE MICROCOMPUTER** 3 credits
Prerequisite: 453/553. Introduction to programming languages for the microcomputer including BASIC, Pascal and Assembler. Programming will be directed towards music educational concepts.
- 614 MEASUREMENT AND EVALUATION IN MUSIC** 3 credits
Prerequisite: permission of instructor. Study and application of principles of music aptitude, music achievement and content evaluation; and research as a function of evaluation.
- 615 MUSICAL STYLES AND ANALYSIS I** 2 credits
Prerequisite: permission of instructor. Detailed study of compositional techniques and stylistic traits observed in Western music from period of Gregorian chant through music of Palestrina, Gesualdo and others of late Renaissance.
- 616 MUSICAL STYLES AND ANALYSIS II** 2 credits
Prerequisite: permission of instructor. Detailed study of compositional techniques and stylistic traits observed in Western music from Monteverdi through early Beethoven.
- 617 MUSICAL STYLES AND ANALYSIS III** 2 credits
Prerequisite: permission of instructor. Detailed study of compositional techniques and stylistic traits observed in Western music from period of late Beethoven through Mahler and Strauss.

- 618 MUSICAL STYLES AND ANALYSIS IV** 2 credits
Prerequisite: permission of instructor. Detailed study of compositional techniques and stylistic traits observed in Western music in 20th Century.
- 619 THEORY AND PEDAGOGY** 2 credits
Prerequisite: permission of instructor. Methodology of theory teaching in 20th Century. Focus on differing philosophies of approach to theory instruction as noted from texts on subject. Recent innovations and techniques of teaching, such as programmed material, computer-assisted instruction studied.
- 620 COMPUTER ANALYSIS IN MUSIC** 2 credits
Prerequisite: a minimum of one course in the 615-618 series. A systematic study of analytic techniques in music which make use of the computer. Hands-on experiences with music encoding, card manipulation, interactive, systems and program writing as related to music analysis.
- 621 MUSIC HISTORY SURVEY: MIDDLE AGES AND RENAISSANCE** 2 credits
Prerequisite: permission of instructor. Historical and stylistic analysis of all aspects of music of Middle Ages and Renaissance. Research and writing in areas of special interest.
- 622 MUSIC HISTORY SURVEY: BAROQUE** 2 credits
Prerequisite: permission of instructor. Historical and stylistic analysis of Baroque music; study in depth of specific examples, from recordings, scores and live performances; continuation and synthesis of approaches normal to study of music history; selected readings related to each student's particular fields of interest; project papers.
- 623 MUSIC HISTORY SURVEY: CLASSIC AND ROMANTIC** 2 credits
Prerequisite: permission of instructor. Historical and stylistic analysis of classic and romantic music; study in depth of specific examples, through recordings, scores and live performances; continuation and synthesis of approaches normal to study of music history; selected readings related to each student's particular fields of interest; project papers.
- 624 MUSIC HISTORY SURVEY: 20TH CENTURY** 2 credits
Prerequisite: permission of instructor. Historical and stylistic analysis of 20th Century music; study in depth of specific examples from scores, recordings and live performances; continuation and synthesis of approaches normal to study of music history; selected readings and project papers.
- 625 GRADUATE BIBLIOGRAPHY AND RESEARCH IN MUSIC** 2 credits
Prerequisite: undergraduate music degree or equivalent. Examination of all types of published music materials; research methods for thesis preparation and professional publishing; field trips to music libraries, computerized music research.
- 630 TEACHING AND LITERATURE: BRASS INSTRUMENTS** 2 credits
Prerequisite: permission of instructor. Research in current trends and issues in brass teaching techniques and appropriate literature.
- 631 TEACHING AND LITERATURE: WOODWIND INSTRUMENTS** 2 credits
Prerequisite: permission of instructor. To delineate and clarify contemporary techniques of woodwind pedagogy and to develop a comprehensive understanding of woodwind literature.
- 633 TEACHING AND LITERATURE: PIANO AND HARPSICHORD** 2 credits
Prerequisite: permission of instructor. The examination of piano and harpsichord literature in historically chronological order with special attention to its pedagogical value and stylistic differences.
- 634 TEACHING AND LITERATURE: STRING INSTRUMENTS** 2 credits
Prerequisite: permission of instructor. Research in current trends and issues in string teaching techniques and appropriate literature.
- 640,1,2,3 ADVANCED ACCOMPANYING I, II, III, IV** 1 credit each
Prerequisite: Graduate standing in keyboard performance and/or accompanying or the permission of the instructor. An in-depth study of principles of accompanying, sightreading, standard repertoire, and transposition.
- 647 MASTER'S CHAMBER RECITAL** 1 credit
Prerequisite: permission of instructor. Composition student will present a recital of chamber music compositions (at least one-half hour in length) written while in residence at the University. Student will actively organize and coordinate the recital and will also participate either as performer or conductor.
- 657 STUDENT RECITAL** 0 credits
Required of all music majors. Forum for student and faculty providing lectures, recitals, and opportunity to practice skills for successful music performance.
- 665 VOCAL PEDAGOGY** 3 credits
Prerequisite: permission. In-depth study of subjects dealing with teaching of voice: physiology of vocal instrument, principles governing vocal production and application of vocal pedagogy.
- 666 ADVANCED SONG LITERATURE** 3 credits
Prerequisite: permission of instructor. Systematic study of song literature presented chronologically according to national schools of composition. Stylistic compositional characteristics and representative works of all major composers of solo song literature.
- 697 ADVANCED PROBLEMS IN MUSIC** 1-3 credits
(May be repeated for a total of eight credits) Prerequisite: permission of graduate adviser. Studies or research projects related to problems in music.
- 698 GRADUATE RECITAL** 2 credits
Prerequisite: permission of graduate adviser. Recital prepared and presented as a requirement for any appropriate degree option. If recital document is to be written in conjunction with the recital, add 699 for the additional credit.
- 699 THESIS RESEARCH/RECITAL DOCUMENT** 4-6 credits
Prerequisite: permission of graduate adviser. Research related to the completion of the master's thesis or recital document written in conjunction with the graduate recital, depending on the student's degree option.
- 604 UNIVERSITY BAND** 1 credit
Includes Symphony Band/Wind Ensemble and Concert Band as major conducted ensembles. Marching Band (fall semester only) and Varsity Band. Membership in all bands open to University student by audition with director of bands.
- 605 VOCAL CHAMBER ENSEMBLE** 1 credit
Membership open to those enrolled in applied voice study. Coaching and rehearsal of solo and ensemble literature for voices from operatic, oratorio and lieder repertoires.
- 606 BRASS ENSEMBLE** 1 credit
Membership by audition. Study and performance of literature for brass ensemble from all periods of music history. Frequent public concerts. For advanced brass players.
- 607 STRING ENSEMBLE** 1 credit
Membership by audition. In-depth study and performance of chamber music literature with special emphasis on string quartet and piano trio.
- 608 OPERA WORKSHOP** 1 credit
Membership by audition. Musical and dramatic group study of excerpts from operatic repertoire. Includes annual production of standard opera and/or contemporary chamber work with staging, costumes and scenery.
- 609 PERCUSSION ENSEMBLE** 1 credit
Membership by audition. Study and performance of literature for various percussion groups; develops skill in ensemble performance.
- 610 WOODWIND ENSEMBLE** 1 credit
Membership by audition. Study and performance of woodwind literature from all periods for various combinations of woodwinds. Develops performance skills and knowledge of woodwind literature.
- 611 CHAMBER ORCHESTRA** 1 credit
Membership by audition. Organization designed to study for performance the substantial repertoire for small orchestra. Open to a student of advanced ability.
- 614 KEYBOARD ENSEMBLE** 1 credit
Involves three hours a week of accompanying. Keyboard major required to enroll for at least three years. Music education major may substitute another musical organization for one year.
- 615 JAZZ ENSEMBLE** 1 credit
Membership by audition. Provides experience in jazz ensemble performance. A student is assumed to have knowledge of rudiments of music and some experience in jazz performance.
- 617 COLLEGIUM MUSICUM** 1 credit
Prerequisite: permission of instructor. A musical ensemble that performs music written before 1750 on copies of authentic instruments.
- 616 SMALL ENSEMBLE — MIXED** 1 credit
Chamber Ensemble, Baroque Ensemble and Contemporary Music Ensemble. Each is a group of diverse instruments which rehearses and performs a selected body of music.
- 619 UNIVERSITY CHORAL UNION** 1 credit
Membership by audition. Ensemble devoted to study and performance of choral masterworks. Registration for credit open to all students who are not vocal music majors.
- 620 CONCERT CHOIR** 1 credit
Membership by audition. Highly select mixed choir. Performs classical literature from all periods. Campus, regional, and tour performances. "Major conducted ensemble" for vocal majors.
- 621 UNIVERSITY SINGERS** 1 credit
Membership by audition. Mixed ensemble devoted to performance of a wide variety of choral literature from classical to popular. "Major conducted ensemble" for vocal majors.
- 623 MADRIGAL SINGERS** 1 credit
Membership by audition. Ensemble devoted to performance of vocal chamber music of the Renaissance. Presents madrigal feasts and concerts on and off campus. Fall semester.
- 624 OPERA CHORUS** 1 credit
Open to students and members of University community by audition. Rehearsal and production of opera and musical theatre literature with staging, costumes, and scenery.

APPLIED MUSIC 7520:

- 521-569 APPLIED MUSIC FOR MUSIC MAJORS** 2 or 4 credits each
The following courses are intended for a student majoring in one of the programs in the Department of Music. Course levels correspond approximately to class standing (100 for freshman, 200 for sophomore, etc.) A student may progress up one level by successfully completing an applied music jury, usually offered in the spring semester. NOTE: No more than eight credits at the 100, 200 or 300 level may apply in music degree programs; no such limit exists for the 400 level.
- 521 PERCUSSION**
- 522 CLASSICAL GUITAR**
- 523 HARP**
- 524 VOICE**
- 525 PIANO**
- 526 ORGAN**
- 527 VIOLIN**
- 528 VIOLA**
- 529 CELLO**
- 530 STRING BASS**
- 531 TRUMPET OR CORNET**
- 532 FRENCH HORN**
- 533 TROMBONE**

MUSICAL ORGANIZATIONS 7510:

- 521 GUITAR CHAMBER MUSIC** 1 credit
Prerequisite: Open to all upper class instrumentalists and vocalists. Guitarists must have taken Guitar Ensemble, 7510:116. Study, coaching, and performance of major works for guitar with other instruments or voice. Major conducted ensemble for guitar majors.
- 602 AKRON SYMPHONY CHORUS** 1 credit
Open to University and community members by audition. Prospective members should contact School of Music two weeks before semester begins. Performs with Akron Symphony Orchestra.
- 603 UNIVERSITY SYMPHONY ORCHESTRA** 1 credit
Membership by audition. Organization devoted to study of orchestral literature. Full-length concerts as well as special University appearances. Major conducted ensemble.

- 534 **BARITONE**
- 535 **TUBA**
- 536 **FLUTE OR PICCOLO**
- 537 **OBOE OR ENGLISH HORN**
- 538 **CLARINET OR BASS CLARINET**
- 539 **BASSOON OR CONTRABASSOON**
- 540 **SAXOPHONE**
- 541 **HARPSICHORD**
- 542 **PRIVATE LESSONS IN MUSIC COMPOSITION** 2-4 credits each
(May be repeated) Prerequisites: 7500.252 and permission of instructor; 7500.452 recommended. Private instruction in composition. Primarily for student whose major is theory-composition.
- 569 **JAZZ VOCAL STYLES**
- 621-661 **GRADUATE STUDY IN APPLIED MUSIC** 2 or 4 credits each
(May be repeated) Prerequisites: undergraduate degree in music, graduate standing and/or permission of instructor determined through audition.
- 621 **PERCUSSION**
- 622 **CLASSICAL GUITAR**
- 623 **HARP**
- 624 **VOICE**
- 625 **PIANO**
- 626 **ORGAN**
- 627 **VIOLIN**
- 628 **VIOLA**
- 629 **CELLO**
- 630 **STRING BASS**
- 631 **TRUMPET OR CORNET**
- 632 **FRENCH HORN**
- 633 **TROMBONE**
- 634 **BARITONE**
- 635 **TUBA**
- 636 **FLUTE OR PICCOLO**
- 637 **OBOE OR ENGLISH HORN**
- 638 **CLARINET OR BASS CLARINET**
- 639 **BASSOON OR CONTRABASSOON**
- 640 **SAXOPHONE**
- 641 **HARPSICHORD**
- 642 **APPLIED COMPOSITION**
- 661 **JAZZ PERCUSSION**
- 662 **JAZZ GUITAR** 2-4 credits
(May be repeated) Prerequisite: undergraduate degree with a major in music. Private instruction in composition offered primarily for a student majoring in composition. Another student may be approved by composition faculty.
- 663 **JAZZ ELECTRIC BASS**
- 664 **JAZZ PIANO**
- 665 **JAZZ TRUMPET**
- 666 **JAZZ TROMBONE**
- 667 **JAZZ SAXOPHONE**
- 668 **JAZZ COMPOSITION**
- 669 **JAZZ VOCAL STYLES**
- 557 **PUBLIC SPEAKING IN AMERICA** 3 credits
Survey and critical analysis of major speakers, speeches and speech movements in American history. Examines how style and content of American speaking influenced events and reflected their times.
- 563 **CORPORATE VIDEO DESIGN** 3 credits
Prerequisites: 201, 280. Client contact, analysis of production problems, design and writing of scripts for promotion, training, and news in corporate and health service settings.
- 564 **CORPORATE VIDEO MANAGEMENT** 3 credits
Prerequisite: 463. Budgeting for individual productions and production facilities, scheduling, script breakdown, management of corporate and health service media facilities.
- 566 **AUDIO AND VIDEO EDITING** 3 credits
Prerequisite: 280. Theory and practice of editing audio and video for broadcast and corporate applications.
- 567 **DIRECTING VIDEO PRODUCTIONS** 3 credits
Prerequisite: 280 and permission. Script analysis, casting, principles of directing, directing nonprofessional talent. Laboratory exercises.
- 571 **THEORIES OF RHETORIC** 3 credits
Study of key figures in history of rhetorical theory, stressing interrelationships among theories of rhetoric, intellectual climates and social climates.
- 567 **THE AMERICAN FILM INDUSTRY** 3 credits
History, current operation and possible futures of the American film industry. Business and industrial aspects of film considered in relation to technological and social change.
- 588 **ADVANCED FILM PRODUCTION** 3 credits
Prerequisite: 288. Advanced study in film. Includes study of 35 mm, 16 mm, and Super-8 mm color and black and white, sound on film. Emphasis on individual production.
- 589 **DOCUMENTARY FORM IN FILM AND TELEVISION** 3 credits
Historical and critical study of documentary and nonfiction forms in film and television with an analysis of their roots in photography and radio. Emphasis on American film and TV.
- 590 **COMMUNICATION WORKSHOP** 1-3 credits
(May be repeated for a total of six credits) Group study or group projects investigating a particular phase of media not covered by other courses in curriculum.
- 592 **CORPORATE VIDEO PRACTICUM** 2-6 credits (repeatable to 6 hours)
Prerequisite: permission. Practical applications of writing, directing, management, recording, and editing skills to problems in business, education, and health services. Lab fee.
- 600 **INTRODUCTION TO GRADUATE STUDY IN COMMUNICATION** 6 credits
Introduction to the ideas and scholarship that constitute the various research interests in the department.
- 603 **EMPIRICAL RESEARCH IN COMMUNICATION** 3 credits
An introduction to elementary concepts of empirical and quantitative research and their application in studies of mass media research topics.
- 604 **INTRODUCTION TO QUANTITATIVE RESEARCH IN COMMUNICATION** 3 credits
Prerequisite: 603 or equivalent. An introduction to reading and understanding research designs employing basic parametric and nonparametric descriptive and hypotheses testing statistical models in mass media-communication.
- 606 **COMMUNICATION PROBLEMS IN THE BASIC SPEECH COURSE** 1 credit
Designed to train a graduate student in methods and materials of introductory speech course. Required of all teaching graduate assistants.
- 608 **COMMUNICATION PEDAGOGY** 3 credits
Familiarizes students with aspects of teaching communication and media courses at the college level.
- 623 **AMERICAN MASS MEDIA SYSTEMS** 3 credits
Analysis of role, performance and impact of media in America.
- 624 **SURVEY OF COMMUNICATION THEORY** 3 credits
Study of dimensions of field of communication: information analysis, social interaction and semantic analysis.
- 625 **THEORIES OF MASS COMMUNICATION** 3 credits
A review of theories of mass media and studies exploring the effect of media.
- 626 **CONTEMPORARY ISSUES IN BROADCASTING** 3 credits
Study of issues important to the management of radio and television broadcast station. Subscription to professional journal required.
- 628 **CONTEMPORARY PUBLIC RELATIONS THEORY** 3 credits
Study and practical application of communication concepts, theories and skills relevant to public relations programs in businesses and nonprofit organizations.
- 631 **SEMINAR: ADVANCED PRODUCTION DESIGN I** 3 credits
Prerequisites: demonstrated competence in either photography, film, or video production and permission of instructor. Analysis of communication problems and the design of solutions mediated by film, video and photography. Emphasis on production research and writing in various media formats. Design and production of a major project.
- 632 **SEMINAR: ADVANCED PRODUCTION DESIGN II** 3 credits
Prerequisite: 631. Continuation of projects in 631 and an opportunity for students to work in additional media.
- 635 **ISSUES IN LEGAL REGULATION OF THE MEDIA** 3 credits
Structure of the regulatory system; current regulatory issues in print, film, radio and television broadcasting, pay and cable TV.
- 645 **INTERCULTURAL COMMUNICATION THEORY** 3 credits
Analysis of the impact on the communication process of cultural difference between communicators; examination of existing literature in intercultural communication.
- 665 **THEORIES OF ARGUMENT AND PERSUASION** 3 credits
Prerequisites: undergraduate course in argumentation and in persuasion, or permission of instructor. Analysis of principal theories related to attitude formation and change.
- 670 **COMMUNICATION CRITICISM** 4 credits
Introduces the basic elements, approaches and types of critical discourse as it is relevant to communication and mass media studies.
- 675 **SEMINAR ON RHETORICAL CRITICISM** 3 credits
(May be repeated for a total of six credits) Organized around special problems and methods involved in analysis of different genres, forms and topics of discourse.
- 676 **SEMINAR IN RHETORICAL THEORY** 3 credits
Concentrated study and research of ancient, modern or contemporary writers or on some specific topic in rhetorical theory.

COMMUNICATION

7600:

- 554 **THEORY OF GROUP PROCESSES** 3 credits
Group communication theory and conference leadership as applied to individual projects and seminar reports.

- 678 RHETORICAL ELEMENTS OF SOCIAL MOVEMENTS** 3 credits
Examines role and function of collective rhetorical discourse in affecting change. Focus on various rhetorical methodologies for understanding social movements and case studies.
- 686 STUDIES IN COMMUNICATION MEDIA: RADIO** 3 credits
Study of radio station programming.
- 687 STUDIES IN COMMUNICATION MEDIA: TELEVISION** 3 credits
- 691 ADVANCED COMMUNICATION STUDIES** 3 credits
(May be repeated for a total of six credits) Special topics in communication in areas of particular faculty expertise. Consult department for particular topic each semester.
- 692 SEMINAR IN FILM** 3 credits
Prerequisite: permission of instructor. Advanced historical and critical study of works and institutions in film and video. Topics vary.
- 697 GRADUATE RESEARCH IN COMMUNICATION** 1-6 credits
(May be repeated for a total of six credits) Prerequisites: 7800:600 and approval of project prospectus one term prior to undertaking the project. Performance of research on problems found in mass media-communication.
- 699 MASTER'S THESIS/PROJECT/PRODUCTION** 1-6 credits
(May be repeated for a total of six credits) Prerequisite: permission of department head.

- 629 TOPICS: SPEECH PATHOLOGY AND AUDIOLOGY** 2 credits
Prerequisite: permission of instructor. Selected current topics in clinical and/or experimental areas of speech pathology, audiology or language. Emphasis on review of current and historical literature.
- 630 LANGUAGE SKILLS IN CHILDREN: ASSESSMENT AND INTERVENTION** 3 credits
Prerequisite: 625 or permission of instructor. Theoretical and applied study of child-language assessment and intervention strategies.
- 631 COMMUNICATION DISORDERS: CLOSED HEAD INJURY** 3 credits
Prerequisites: permission of instructor. A study of behavioral deficits, stages of recovery, assessment techniques, and principles of cognitive rehabilitation related to closed head injury.
- 638 SEMINAR IN LANGUAGE AND SPEECH OF THE HEARING IMPAIRED** 2 credits
Study of development of language and speech in hearing-impaired children, emphasizing psycholinguistic approach, and means of intervention. Communicative processes of hearing-impaired adults. Effect of conditions of minimum auditory stimulation and acoustic feedback on speech and language. Methods of speech conservation.
- 639 ADVANCED CLINICAL TESTING** 4 credits
Theoretical basis for pure tone, speech tests, masking and acoustic impedance measurements. Review of classical and current literature relative to above tests.
- 640 SPECIAL TESTS/MEDICAL AUDIOLOGY** 4 credits
Prerequisite: 639 or permission of instructor. Underlying psychoacoustic principles of administration and interpretation of site-of-lesion tests. Relationship between otology and audiology; application of clinical audiology in medical environment.
- 641 AMPLIFICATION** 3 credits
Prerequisite: 639 or permission of instructor. Components of amplification systems; methods of evaluating hearing aid performance.
- 642 PEDIATRIC AUDIOLOGY** 2 credits
Prerequisite: 639 or permission of instructor. Etiology of hearing loss in children, techniques for testing preschool and school-age children and other difficult-to-test clients.
- 643 INDUSTRIAL AUDIOLOGY** 2 credits
Prerequisite: 639 or permission of instructor. Theoretical principles of noise measurement; etiology of noise-induced hearing loss and acoustic trauma; industrial hearing conservation programs; Occupational Safety and Health Act (O.S.H.A.) regulations.
- 644 AURAL REHABILITATION** 4 credits
Prerequisite: permission of instructor. Review of current methodologies employed in aural rehabilitation of children and adults, as well as current and potential areas of research.
- 645 EVOKED POTENTIALS** 2 credits
Prerequisite: permission of instructor. A study of auditory, visual and somatosensory evoked potentials and their clinical applications in audiology and neuro-otology.
- 647 EXPERIMENTAL AUDIOLOGY** 2 credits
Prerequisites: six graduate audiology credits or permission of instructor. Principles of psychoacoustics. Review of instrumentation and research techniques. Study of significant literature in the field.
- 649 ELECTRONYSTAGMOGRAPHY** 2 credits
Prerequisite: permission of instructor. Study of the anatomy and physiology of the vestibular system; nystagmus; electronystagmographic (ENG) recording procedures; ENG protocols; interpretation of ENG results.
- 650 ADVANCED CLINICAL PRACTICUM: DIFFERENTIAL DIAGNOSIS** 1 credit
Prerequisite: Permission. (May be repeated for a maximum of six credits.) Supervised clinical practicum in diagnostic procedures. Includes preparation of reports.
- 651 ADVANCED CLINICAL PRACTICUM: VOICE** 1 credit
Prerequisite: 626 or permission. (May be repeated for a maximum of six credits.) Supervised clinical practicum in treatment of voice disorders. Includes diagnostic/therapy procedures and preparation of reports.
- 652 ADVANCED CLINICAL PRACTICUM: FLUENCY** 1 credit
Prerequisite: 627 or permission. (May be repeated for a maximum of six credits.) Supervised clinical practicum in treatment of fluency disorders. Includes diagnostic/therapy procedures and preparation of reports.
- 654 ADVANCED CLINICAL PRACTICUM: DIAGNOSTIC AUDIOLOGY** 1 credit
Prerequisite: Permission. (May be repeated for a maximum of six credits.) Supervised clinical practicum in audiology diagnostics. Includes diagnostic procedures and preparation of reports.
- 655 ADVANCED CLINICAL PRACTICUM: ARTICULATION** 1 credit
Prerequisite: 321 or permission. (May be repeated for a maximum of six credits.) Supervised clinical practicum in treatment of articulation disorders. Includes diagnostic/treatment procedures and preparation of reports.
- 656 ADVANCED CLINICAL PRACTICUM: LANGUAGE** 1 credit
Prerequisite: Permission. (May be repeated for a maximum of six credits.) Supervised clinical practicum in treatment of language disorders. Includes diagnostic/treatment procedures and preparation of reports.
- 657 ADVANCED CLINICAL PRACTICUM: REHABILITATIVE AUDIOLOGY** 1 credit
Prerequisite: Permission. (May be repeated for a maximum of six credits.) Supervised clinical practicum in hearing rehabilitation. Includes diagnostic/treatment procedures and preparation of reports.
- 695 EXTERNSHIP: SPEECH PATHOLOGY AND AUDIOLOGY** 2-4 credits
Prerequisite: Permission. (May be repeated for a maximum of six credits.) Clinical practicum in a selected speech-language-hearing facility.
- 697 SPECIAL PROBLEMS: SPEECH PATHOLOGY AND/OR AUDIOLOGY** 1-3 credits
(May be repeated for a total of six credits) Prerequisite: permission of instructor. Guided research or reading in selected topics in speech pathology, audiology or language disorders.
- 699 RESEARCH AND THESIS** 4-6 credits
(May be repeated for a total of six credits) Prerequisite: permission of department head.

COMMUNICATIVE DISORDERS

7700:

- 530 ASPECTS OF NORMAL LANGUAGE DEVELOPMENT** 3 credits
(Not open to communicative disorders major) Introduction to acquisition and development of comprehension and production of language — phonologically, semantically and syntactically. Relates language acquisition to perceptual development of child and looks at function of language in individual, family and school.
- 560 SPEECH-LANGUAGE AND HEARING DISORDERS IN THE PUBLIC SCHOOLS** 2 credits
(Not open to communicative disorders major) Nature, causes and treatment of speech, hearing and language disorders in public schools. Special reference to role of classroom teacher in identifying and referring student with suspected problems and in working with school clinician.
- 561 ORGANIZATION AND ADMINISTRATION: PUBLIC SCHOOL SPEECH-LANGUAGE AND HEARING PROGRAMS** 2 credits
Prerequisites: Senior or graduate standing. For clinicians who plan to work in public school systems. Covers program requirements and professional/ethical issues imposed by PL 94-142.
- 563 COMMUNICATION DISORDERS: GERIATRIC POPULATION** 3 credits
(Not open to communicative disorders major) Examination of communication disorders that exist in geriatric population. Focus on etiology, symptomatology and concomitant rehabilitative procedures. *Designed for a student interested in the aging population.
- 585 COMMUNICATIVE DISORDERS IN THE DEVELOPMENTALLY DISABLED** 4 credits
Theory and current research related to the etiology, diagnosis and remediation of communicative disorders in intellectually and/or neuromotorically delayed children.
- 590 WORKSHOP: COMMUNICATIVE DISORDERS** 1-3 credits
(May be repeated for a total of four credits) Prerequisite: permission. Group investigation of particular phase of speech pathology and/or audiology not offered by other courses.
- 601 ADMINISTRATION AND SUPERVISION IN SPEECH AND HEARING PROGRAMS** 4 credits
Prerequisite: permission of instructor. Organization and management of speech and hearing programs in voluntary and official agencies. Philosophy and methodology in supervision of services.
- 610 INSTRUMENTATION IN SPEECH PATHOLOGY AND AUDIOLOGY** 2 credits
Principles and use of clinical and research instrumentation in speech and hearing.
- 611 RESEARCH METHODS IN COMMUNICATIVE DISORDERS I** 3 credits
Introduction to experimental design in field of communicative disorders.
- 612 RESEARCH METHODS IN COMMUNICATIVE DISORDERS II** 2 credits
Prerequisite: 611. Advanced experimental methods; development of a research study.
- 619 COMMUNICATION DISORDERS: ADULT DYSPHAGIA AND APRAXIA** 2 credits
Development, symptoms, diagnosis and treatment of adult dysphagia and apraxia.
- 620 ARTICULATION** 2 credits
Historical background, current theories and research related to etiology, evaluation and treatment of articulation and phonology disorders.
- 621 COMMUNICATIVE DISORDERS IN CLEFT PALATE** 2 credits
Historical background, current theories and research related to etiology, diagnosis and treatment of cleft palate.
- 624 APHASIA** 2 credits
Historical background, current theories and research related to etiology, diagnosis and treatment of adult aphasia.
- 625 LANGUAGE DEVELOPMENT: NORMAL AND DISORDERED** 3 credits
Survey of research in normal and disordered development of language skills.
- 626 VOICE PATHOLOGY** 3 credits
Prerequisite: permission of the instructor. Background and current research related to normal vocal function as well as the etiology, diagnosis and therapy of various disorders of voice.
- 627 STUTTERING: THEORIES AND THERAPIES** 3 credits
Reading and discussion of selected theories and therapies.
- 628 TOPICS IN DIFFERENTIAL DIAGNOSIS OF SPEECH AND LANGUAGE DISORDERS** 2 credits
(May be repeated for a total of four credits) Prerequisite: permission of director of Speech and Hearing Center.

SOCIAL WORK

7750:

- 501 SOCIAL WORK PRACTICE I** 3 credits
Prerequisite: 276 or permission of instructor. Basic concepts and methods of social work practice, particularly relating to understanding and working with individuals and families.

- 502 SOCIAL WORK PRACTICE II** 3 credits
Prerequisite: 401 or permission of instructor. Concepts and methods of social work practice particularly relating to understanding and working with groups in various settings in our society.
- 503 SOCIAL WORK PRACTICE III** 3 credits
Prerequisite: 401 or permission of instructor. Development of understanding and practice methods for utilization of community organization and social planning as social work process in assessing problems and developing program to meet needs.
- 504 SOCIAL WORK PRACTICE IV** 3 credits
Prerequisite: 401 or permission of instructor. Professional social work practice with families in social services; the dynamics of family systems, assessment of family function and dysfunction, professional helping processes.
- 510 MINORITY ISSUES IN SOCIAL WORK PRACTICE** 3 credits
Prerequisite: 276 or permission of instructor; taken prior to or concurrent with 401, 402, or 404. Racial, ethnic and cultural issues in social work related to various practice and theoretical perspectives, to various types of social problems, service agencies, individual family, group, community and societal contexts integrated with the methodological processes of the social work practitioners.
- 511 WOMEN'S ISSUES IN SOCIAL WORK PRACTICE** 3 credits
Prerequisite: 276 or permission of instructor. Social work practice, knowledge and skill, social welfare institutions and social policy in relation to women's issues and concerns in the United States.
- 525 SOCIAL WORK ETHICS** 3 credits
Prerequisite: 276 or permission of instructor. Social Worker's code of ethics as applied to practices, problems and issues in social work.
- 527 HUMAN BEHAVIOR AND SOCIAL ENVIRONMENT I** 3 credits
Prerequisite for 427: 276 or permission of instructor; for 527: permission of instructor. Social work perspective on human development across the life cycle. Human diversity approach consistent with the needs of social work students preparing for practice.
- 530 HUMAN BEHAVIOR AND SOCIAL ENVIRONMENT II** 3 credits
Prerequisites for 430: 276, 427 or permission of instructor; for 530: permission of instructor. Emphasis on social workers' understanding of and use of individual interaction and growth within family as a system, groups, roles, organizations, community and culture.
- 540 SOCIAL WORK RESEARCH I** 3 credits
Prerequisites for 440: 276 or permission of instructor; for 540: permission. Social work practitioner's role in utilization of scientific method in the conduct of practice and utilization of social work research as found in social work and social science literature for improvement and advancement of social work practice.
- 541 SOCIAL WORK RESEARCH II** 3 credits
Prerequisite for 441: 440 or permission of instructor; for 541: permission of instructor. Evaluation of social work intervention with individual, group and community. Processing and interpreting agency information for better practice, policy and administrative decisions.
- 545 SOCIAL POLICY ANALYSIS FOR SOCIAL WORKERS** 3 credits
Prerequisite for 445: 276 or permission of instructor; for 545: undergraduate social work degree or permission. Description, analysis and construction of social policy in social services; to understanding forces and processes which establish or change social policies, to predict consequences of social policies and to establish goals for social policy development; integrated into effective social work methodology.
- 550 SOCIAL NEEDS AND SERVICES FOR LATER ADULTHOOD AND AGING** 3 credits
Prerequisite: 276 or permission of instructor. Application of knowledge and principles of professional social work practice to understanding, development and provision of social services to meet needs of aging and later maturity individuals, families and communities and institutions serving them and their relatives.
- 551 SOCIAL WORK IN CHILD WELFARE** 3 credits
Prerequisite: 276 or permission of instructor. In-depth exploration of structure and functioning of social services designed to help children, and of practice of social work in child-welfare settings. Consideration of supportive, supplementary and substitutive services.
- 552 SOCIAL WORK IN MENTAL HEALTH** 3 credits
Prerequisite: 276 or permission of instructor. Issues, organization, development and methodologies of current professional social work practice in mental-health settings.
- 554 SOCIAL WORK IN JUVENILE JUSTICE** 3 credits
Prerequisite: 276 or permission of instructor (undergraduate). The theory and practice of social work in the juvenile justice systems of the United States. Traditional procedures and recent developments, prevention, diversion and community outreach, legal concerns, case management, institutional functioning.
- 555 THE BLACK FAMILY** 3 credits
Prerequisite: 276 or permission of instructor. Contemporary problems facing black families; male-female relationships, single parent households, black teens and elderly, public policy, theoretical models, explaining development of the black family.
- 556 SOCIAL WORK IN HEALTH SERVICES** 3 credits
Prerequisite: 276 or permission of instructor. Policies, programs and practice in health-care settings: short-term, intermediate and long-term hospitals, out-patient services, emergency services, clinics, visiting nurse services, nursing homes, pediatric services, self-help organizations.
- 557 ADVANCED PRACTICE WITH INDIVIDUALS** 3 credits
Prerequisite: 401 or permission of instructor (undergraduate); undergraduate social work degree or permission (graduate). Advanced professional development of direct and indirect strategies and techniques of intervention to aid individuals in improving psychosocial functioning.
- 558 ADULT DAY CARE** 3 credits
Prerequisite for 458: 276 or permission of instructor; for 558: permission of instructor. Planning, development, implementing, evaluating and delivery of adult day-care services.
- 559 SOCIAL WORK WITH THE MENTALLY RETARDED** 3 credits
Prerequisite: 276 or permission of instructor. Application of social work principles in the provision of social services to meet the needs of the mentally retarded and developmentally disabled and their families.
- 565 ADMINISTRATION AND SUPERVISION IN SOCIAL WORK** 3 credits
Prerequisite: 401 or permission of instructor. Preparation for use of supervision, staff development and program planning in a social work agency. Examines the social work/welfare agency in its community as it affects its organizational goal-setting and program-implementation problems.
- 570 LAW FOR SOCIAL WORKERS** 3 credits
Prerequisite: 276 or permission of instructor. Basic terminology, theories, principles, organization and procedures of law will be explored along with the relationships between social work and law and comparisons of the theoretical bases of the two professions.

- 575 SUBSTANCE ABUSE AND SOCIAL WORK PRACTICE** 3 credits
Prerequisite: 276 or permission of instructor. Provides students with the essential knowledge and skill for successful social work practice with people involved in substance abuse.
- 580 SPECIAL TOPICS IN SOCIAL WORK AND SOCIAL WELFARE** 1-3 credits
Prerequisite: permission of instructor. Analysis of current social work and social welfare theory and policy, settings, innovative interventions and trends in delivery systems in relation to selected areas of concern. Topics and credits variable.
- 590 SOCIAL WORK WORKSHOP** 1-4 credits
(May be repeated for a total of six credits) Prerequisite: permission of instructor. Group investigation of a particular phase of social work or social welfare not offered by other courses in curriculum.
- 597 INDIVIDUAL INVESTIGATIONS IN SOCIAL WORK SOCIAL WELFARE** 1-3 credits
Prerequisites: permission and prearrangement with instructor. Individual readings, research or projects in area of interest in social welfare theory or institutional operations or in social work practice under guidance of social work faculty member. Preparation of report paper appropriate to nature of topic. For social work major.
- 673 CONTEMPORARY SOCIAL WORK APPLICATIONS** 3 credits
Contemporary social work concepts and methods compared and applied in various social welfare, community service, educational and health settings. Particularly useful for professionals from related fields and for advanced practitioners.

THEATRE

7800:

- 550 PERFORMANCE PROJECTS** 3 credits
(May be repeated for a total of six credits.) Prerequisite: permission of instructor. Preparation and presentation of programs and projects for community and campus organizations plus other projects as announced.
- 562 PLAYWRITING** 2 credits
Prerequisite: permission. Principles of dramatic construction learned through analysis of playwright's art, as well as through writing of individual dramatic compositions.
- 567 CONTEMPORARY THEATRE STYLES** 3 credits
A detailed examination of representative plays of the contemporary theatre.
- 568 CHILDREN'S THEATRE** 3 credits
Study of theatre for child audience: play selection, set design and construction, acting, directing. A full-length play for children produced by the class may culminate the course.
- 575 ACTING FOR THE MUSICAL THEATRE** 3 credits
Prerequisites: 373, 7520:124, permission of instructor. A scene study course in analyzing and performing roles in American musicals. Accompanist provided.
- 590 WORKSHOP IN THEATRE ARTS** 1-3 credits
490: (May be repeated for a total of eight credits) 590: (May be repeated for a total of six credits toward degree) Prerequisite: advanced standing or permission. Group study or group projects investigating particular phase of theatre arts not covered by other courses in curriculum.
- 600 INTRODUCTION TO GRADUATE STUDIES** 3 credits
Exploration of the basic research tools and methods appropriate to the discipline, including utilization of the computer. Guidelines for writing thesis and preparing production document.
- 603 SPECIAL TOPICS IN THEATRE ARTS** 1-4 credits
(May be repeated as different subject areas are covered, but no more than 12 credits may be applied toward M.A. degree) Traditional and experimental courses in theatre, supplementing those listed in the *General Bulletin*.
- 605 COLLOQUIUM ON THE ARTS** 2 credits
A brief exploration of the major visual and performing art forms and organizations examined in relationship to the business management of arts. Team-laught.
- 606 PRINCIPLES OF MODERN SCENOGRAPHY** 3 credits
Prerequisite: permission of instructor. Theory and practice of stage scenographic design and technique as a collaborative art form.
- 608 STAGE DESIGN FROM CONCEPT TO EXECUTION** 3 credits
Lectures, research, and studio projects. Study of types and styles of stage design, analysis of modern stage design as it applies to stage production.
- 633 SUMMER THEATRE** 3 credits
Prerequisite: permission of instructor/audition. Practical laboratory experience in one or more discipline during the summer doing production and/or management work at advanced level. (May be repeated to 12 credits.)
- 636 LIGHTING DESIGN** 3 credits
Problems in lighting pointed towards a fundamental understanding and implementation of design for Dance, Drama, and Musical Theatre. Design projects will be assigned.
- 641 PROBLEMS IN DIRECTING** 3 credits
Advanced directing course, with special emphasis on staging of complex plays from all periods of dramatic literature.
- 645 SEMINAR IN DRAMATIC LITERATURE** 3 credits
Representative Western stage plays (non-American) are examined in their theatrical, historical, and critical/theoretical contexts.
- 646 GRADUATE ACTING: TECHNIQUES** 3 credits
Advanced study of basic acting techniques, especially Stanislavski, through analysis and performance. Voice/Movement Lab required.
- 647 GRADUATE ACTING: STYLES** 3 credits
Advanced study of classical acting techniques through analysis and performance. Voice/Movement Lab required.
- 648 GRADUATE ACTING: PROBLEMS** 3 credits
Study of problems confronting the advanced actor in various modern styles of performance. Voice/Movement Lab required.
- 651 ADVANCED PROBLEMS IN DIRECTING** 3 credits
Prerequisite: 641 or permission of instructor. A continuation of 641. Further in-depth investigation of styles and techniques, interpretative concepts, and coaching of actors will continue to take place.
- 653 SEMINAR IN COMMEDIA DELL'ARTE** 3 credits
The origins and history, scenario, actor and troupes, and staging techniques of the *Commedia*.

- 655 DRAMATIC THEORY AND CRITICISM** 2 credits
An exploration of the major dramatic theorists and critics from Classical Greek to the present, with an emphasis on the 20th Century.
- 658 HISTORY OF TECHNICAL PRODUCTION** 3 credits
Theatre history from the Greeks to the present with emphasis on physical theatre, conventions, and theatre architecture of each period.
- 659 HISTORY AND THEORY OF STAGE LIGHTING** 3 credits
Historical survey of evolution of stage lighting culminating in understanding of modern lighting design skills and their practical application. Term paper or major project required.
- 660 ADVANCED TECHNICAL THEATRE** 2 credits
Processes including multiple set productions, revolves and their rigging, techniques in simple hydraulics, pneumatics and load capacities and properties and techniques in multi-media.
- 661 SEMINAR IN STAGE COSTUME DESIGN** 3 credits
Prerequisite: undergraduate costume design course or permission of instructor. Study of special problems in costume design for musical or opera theatre, research of specific period costume patterns, portfolio projects, research of noted designers.
- 662 SEMINAR IN SCENE DESIGN** 3 credits
Prerequisite: 106 or undergraduate scene design course or permission of instructor. Study of problems in scene design: portfolio projects, research of noted designers, studies of theatre spaces and new scenographic materials.
- 663 SEMINAR: AMERICAN THEATRE** 3 credits
An exploration of representative plays, players and playwrights from colonial times to present. Term paper or project required.
- 665 AUDIENCE DEVELOPMENT** 3 credits
Developing audiences for the Arts through Arts marketing techniques, including season and single ticket campaigns, promotional strategies, media/public relations, market research and telemarketing.
- 666 PRINCIPLES OF ARTS ADMINISTRATION** 3 credits
Principles and practices in non-profit arts management, including organizational structure, function of boards, personnel and volunteer management, and public policy for the arts.
- 662 FUND RAISING AND GRANTSMANSHIP IN THE ARTS** 3 credits
Techniques and execution of a development campaign for individuals, corporations, foundations, federal and state grants, and endowment, including research and proposal writing.
- 690 GRADUATE RESEARCH/READINGS** 1-3 credits
(May be repeated for a total of nine credits) Prerequisite: permission. Individual research of independent readings under supervision of member of theatre graduate faculty.
- 691 ARTS ADMINISTRATION PRACTICES AND POLICIES** 3 credits
Financial management of the arts, facilities management, presenting performances, touring, and unique management problems in non-profit theatre companies, dance companies, orchestras, and museums.
- 692 LEGAL ASPECTS OF ARTS ADMINISTRATORS** 3 credits
Legal responsibilities and liabilities of an arts organization, contracts, copyright law, insurance, taxation, artists' rights, personnel law and labor law.
- 698 INTERNSHIP** 3-6 credits
Prerequisite: permission. Faculty supervised work experience in which student participates in an arts management situation with a selected cultural organization.

- 699 RESEARCH OR CREATIVE THESIS** 3-6 credits
(May be repeated for a total of six credits) Prerequisite: permission of coordinator of graduate theatre program. Research related to the completion of the master's thesis or the production document written in conjunction with an approved production project, depending on the student's degree option.

THEATRE ORGANIZATIONS

7810:

- 601 PRODUCTION PRACTICUM/DESIGN/TECHNOLOGY** 1-2 credits
(May be repeated for a total of four credits) Prerequisite: permission of instructor. Practice in selected production design/technology operations, applications and techniques as they apply to production projects and major departmental productions.
- 605 PERFORMANCE PRACTICUM** 1-2 credits
(May be repeated for a total of 12 credits) Prerequisite: permission of project adviser. Recognition of work undertaken by the student when performing a role in a theatre production. Credit assigned and work supervised by faculty project supervisor.

DANCE

7900:

- 590 WORKSHOP IN DANCE** 1-3 credits
(May be repeated for a total of eight credits) Prerequisite: advanced standing or permission. Group study or group projects investigating particular phase of dance not covered by other courses in curriculum.

DANCE PERFORMANCE

7920:

- 590 WORKSHOP IN DANCE** 1-3 credits
Prerequisite: Advanced standing or permission. (May be repeated for a total of eight credits. Group study/projects investigating a particular field of dance not covered by other courses.

College of Nursing

NURSING

8200:

- 530 HEALTH-CARE (CURRENT YEAR): ISSUES AND NURSING** 2 credits
Prerequisite: acceptance in the college. Survey and exploration of the state of health-care delivery in the United States today and the ramifications and implications for nursing.
- 589 SPECIAL TOPICS: NURSING** 1-4 credits
(May be repeated as new topics are presented) Group studies of special topics in nursing. May not be used to meet requirements for the major in nursing. May be used for elective credit.
- 593 WORKSHOPS** 1-3 credits
(May be repeated as new topics are presented) Group studies of special topics in nursing. May not be used to meet college undergraduate or graduate major requirements. May be used for elective credit only.
- 598 SPECIAL READINGS** 1-4 credits
Prerequisite: permission of student's adviser or dean. Special readings in an area of concentration may be taken to satisfy elective credit. Special readings may not be used to satisfy requirements of the major.
- 603 THEORETICAL BASIS FOR NURSING** 3 credits
Prerequisite: acceptance in the Graduate Nursing Program. Analysis of concepts and theories applicable to nursing. Special emphasis is given to critique and utilization of nursing theoretical models.
- 613 NURSING INQUIRY** 3 credits
Prerequisites: 603 and 3470:664. Theories, concepts, and ethical aspects relating to scientific inquiry are examined. Students participate in critical analysis of nursing research. Emphasis on identification of researchable problems.
- 619 NURSING ASSESSMENT OF FAMILIES** 3 credits
Prerequisite: 603. Advanced nursing course focusing on assessment of families. Seminars and practicum experiences are utilized.
- 622 FAMILY NURSING I** 4 credits
Prerequisites: 603 and 619. Theory and practice of family nursing focusing on concepts, theories and practice relative to families within the environment.
- 623 FAMILY NURSING II** 4 credits
Prerequisites: 603, 619 and 622. Continuation of 622.
- 624 NURSING OF FAMILIES WITH GROWING CHILDREN** 3 credits
Prerequisites: 603, 613, 619 and 622. Corequisites: 680 or 685. Focuses on advanced nursing care of families with growing children experiencing varying states of health.
- 625 TEACHING STRATEGIES IN NURSING EDUCATION** 3 credits
Prerequisites: 603, 613, 619 and 622. Focus on the development of increased knowledge for the selection of learning opportunities in health care and classroom settings.
- 626 NURSING OF FAMILIES WITH ADULT MEMBERS** 3 credits
Prerequisites: 603, 613, 619 and 622. Focuses on advanced nursing care of families with adult members experiencing varying states of health.
- 628 NURSING OF EXPANDING FAMILIES** 3 credits
Prerequisites: 603, 613, 619 and 622. Focuses on advanced nursing care of expanding families experiencing varying states of health.
- 629 FINANCIAL MANAGEMENT FOR NURSING ADMINISTRATION** 3 credits
Prerequisite: 603, 613, 619, 622 or special permission. Concepts, theories and processes of financial management for nursing administration. Focuses on health care economics and fiscal accountability with consideration of nursing standards.
- 630 HUMAN RESOURCES IN NURSING SETTINGS** 3 credits
Prerequisite: 603, 613, 619. Corequisite: 622. Identifies and examines major issues related to human resources in nursing settings.
- 635 ORGANIZATIONAL BEHAVIOR IN NURSING SETTINGS** 3 credits
Prerequisite: 603, 613, 619, and 622. Examines nursing organizational behavior in nursing settings.
- 670,1 SPECIAL TOPICS** 2 credits each
Prerequisite: completion of all required first-year courses. Group study of selected topics and areas of interest in advanced nursing.
- 672 INDEPENDENT STUDY** 1-4 credits
Opportunity for the advanced graduate nursing practice in a selected area of specialization.
- 673 NURSING OF FAMILIES WITH OLDER MEMBERS** 3 credits
Prerequisites: 603, 613, 619 and 622. Explores factors that influence advanced nursing care of families with older members experiencing varying states of health.
- 675 CULTURE, ETHNICITY AND HEALTH CARE** 3 credits
Increase cultural sensitivity through exploration of diverse health values, beliefs, and practices of selected ethnic groups with emphasis on factors affecting health care choices.
- 680 LEADERSHIP SEMINAR: CLINICAL NURSE SPECIALIZATION** 3 credits
Prerequisites: 603, 613, 619, 622. Examines family nursing to identify and explore practice issues and goals.
- 681 LEADERSHIP PRACTICUM: CLINICAL NURSE SPECIALIZATION** 3 credits
Prerequisite: 680. Guided study and practice in the leadership role of clinical nurse specialist in care of families.
- 685 LEADERSHIP SEMINAR: EDUCATION** 3 credits
Prerequisites: 603, 613, 619, 622. Expands the leadership role of family nurse to the educator perspective. Explores curriculum development and utilizes a variety of frameworks to critique and develop nursing curriculum.
- 686 LEADERSHIP PRACTICUM: EDUCATION** 3 credits
Prerequisites: 623, 685; corequisite: 689. Guided study and practice in the leadership role of a nurse educator. Students present lectures and supervise students at nursing educational institutions and clinical settings.
- 687 LEADERSHIP SEMINAR: ADMINISTRATION** 3 credits
Prerequisite or corequisite: 623. Prerequisite: 622. Leadership and management theories are utilized to develop and identify nursing administrative goals, strategies, and to expand the leadership role of the nurse administrator.
- 688 LEADERSHIP PRACTICUM: ADMINISTRATION** 3 credits
Prerequisite: 687. Guided study and practice in the leadership role of a nurse administrator.
- 689 COLLOQUIUM** 1 credit
Corequisites: 681, 686, 688. Similarities and differences of the family nurse leadership roles in education, administration, and clinical specialization with families are examined in light of selected contemporary issues/concerns in nursing.
- 699 THESIS/NONTHESIS RESEARCH** 1-4 credits
Prerequisites: 613, 623; corequisite: 623. Supervised research in a specific area of advanced nursing, or supervised advanced project/practice/study experience.

College of Polymer Science and Polymer Engineering

POLYMER ENGINEERING 9841:

- 601 POLYMER ENGINEERING SEMINAR** 1 credit
Presentations of recent research on topics in polymer engineering by internal and external speakers.
- 611 STRUCTURAL CHARACTERIZATION OF POLYMERS WITH ELECTROMAGNETIC RADIATION** 2 credits
Characterization of orientation, morphology, superstructure in polymers using x-ray, light scattering, birefringence, dichroism. Crystallography, unit cell determination.
- 621 RHEOLOGY AND POLYMER PROCESSING** 3 credits
Experimental methods of determination of rheological properties of polymer melts, solutions, elastomers. Structure-flow behavior relationships, viscoelastic fluid theory, application to extrusion, fiber, film processing molding. Structure development in processing.
- 622 ANALYSIS AND DESIGN OF POLYMER PROCESSING OPERATIONS I** 3 credits
Prerequisite: 621. Mathematical modeling and engineering design analysis of polymer processing operations including extruder screws, injection molds, dies, fibers, film formation.
- 623 ANALYSIS AND DESIGN OF POLYMER PROCESSING OPERATIONS II** 3 credits
Prerequisite: permission of instructor. Basic studies of non-isothermal phenomena in polymer engineering emphasizing crystallization, vitrification, frozen-in orientation and residual stresses, applications, including fiber spinning and film extrusion.
- 631 ENGINEERING PROPERTIES OF SOLID POLYMERS** 2 credits
Transitions as a function of polymer structure, optical characteristics, mechanical including ultimate properties, viscoelastic behavior of elastomers and plastics, large strain behavior. Emphasis on experimental methods.
- 635 MECHANICAL STRENGTH OF POLYMERIC SOLIDS** 2 credits
Extended chain crystal and theoretical strength of crystalline polymers, impact and high speed testing fatigue and long term testing, environmental stress cracking, statistical nature of failure, reinforcement and impact modification of thermoplastics, reinforcement of thermosets, reinforcement of elastomers.
- 641 POLYMERIC MATERIALS ENGINEERING SCIENCES** 2 credits
Physico-chemical properties of amorphous and crystalline polymers. Glass transitions, crystallization, molecular orientation and morphology of important commercial polymers, fabricated products and composite materials.
- 642 ENGINEERING ASPECTS OF POLYMER COLLOIDS** 2 credits
Thermodynamic properties of polymer colloids, sol-gel transformation, rheology of polymer solutions, gels, suspensions and emulsions, phase separation, applications to paints and plastisols technology.
- 650 INTRODUCTION TO POLYMER ENGINEERING** 2 credits
Basic concepts of polymer engineering taught in lecture-laboratory format intended for orientation of new graduate students.
- 651 POLYMER ENGINEERING LABORATORY** 2 credits
Laboratory experiments on the rheological characterization of polymer melts fabrication of engineering products, structural investigation of polymeric parts.
- 661 POLYMERIZATION REACTOR ENGINEERING** 3 credits
Polymerization kinetics, classical reactor design, comparison of polymerization in batch and continuous stirred tank reactors, flow patterns around agitators, tubular reactors, reactor stability.
- 699 MASTER'S THESIS** 1-6 credits
(May be repeated) Supervised original research in specific area of polymer engineering.
- 711 ADVANCED ELECTROMAGNETIC AND OPTICAL PROPERTIES AND INVESTIGATIONS OF POLYMERS** 2 credits
Maxwell's equations with application to anisotropic dielectrics, birefringence and dichroism and representation of orientation, optical instruments, piezoelectricity, scattering and diffraction of x-rays and light, Mie scattering, applications.
- 712 RHEO-OPTICS OF POLYMERS** 2 credits
Applications of rheo-optical methods as means of determining stress fields in polymeric glasses and fluids during deformation, rheo-optical properties of polymers in glassy, rubbery and fluid states. Theory of dynamic birefringence and its application to mechanical relaxations of amorphous and semi-crystalline polymers, and recent experimental results.
- 713 RADIATION SCATTERING AND DIFFRACTION BY POLYMERIC MATERIALS** 2 credits
Principles of scattering and diffraction theory as applied to polymer crystals, glasses and multiphase systems. Wide angle and small angle x-ray, light and neutron scattering, analysis and determination of crystal structures, mathematical description of orientation distribution of polymer and determination of orientation factors by WAXD and other methods.
- 716 NON-NEWTONIAN FLOW** 2 credits
Prerequisite: 4200:600. Rheological behavior of non-Newtonian fluids. Development of fluid constitutive equations. Viscometric methods.

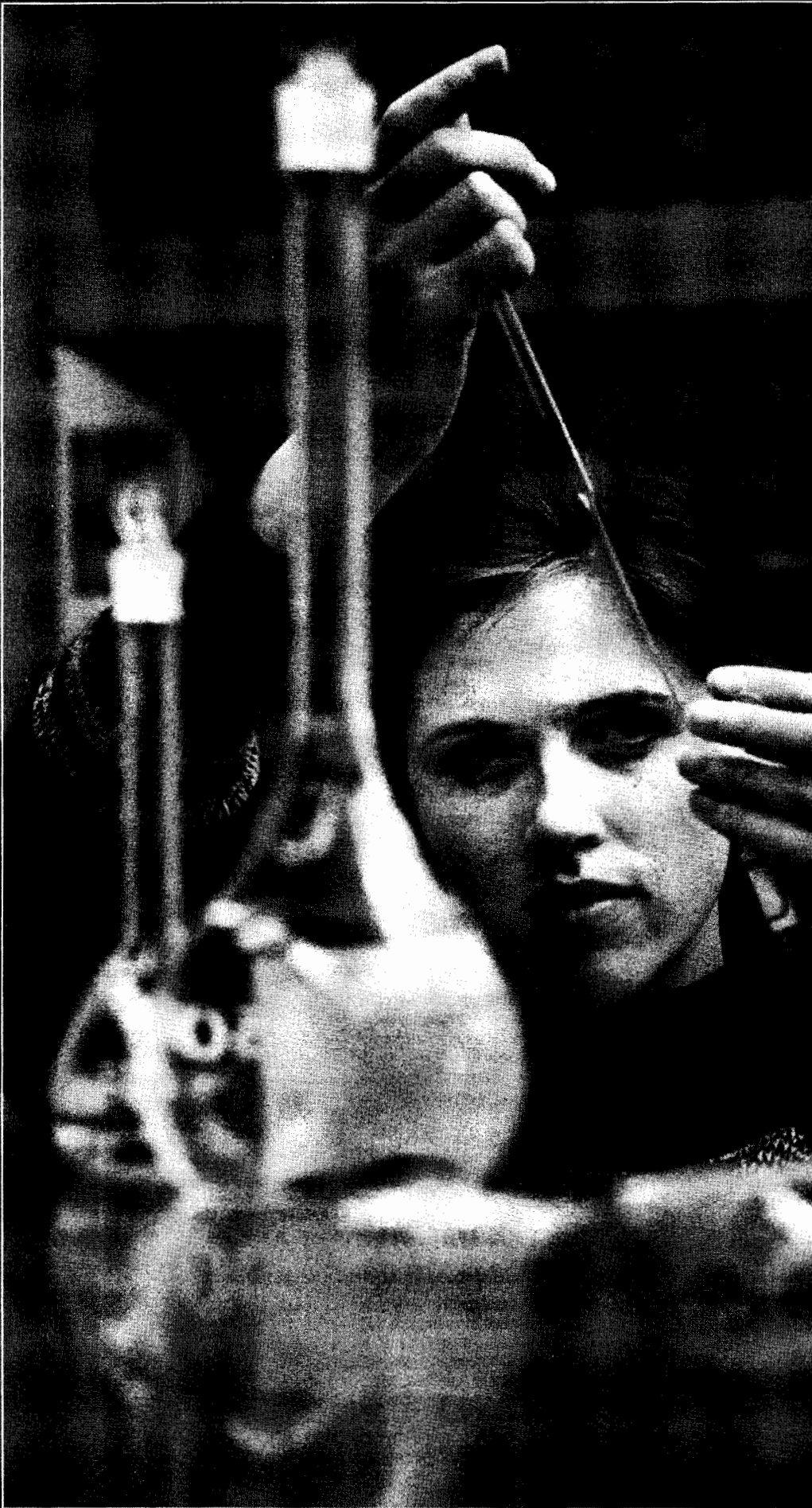
- 721 RHEOLOGY AND PROCESSING TWO-PHASE POLYMER SYSTEMS** 2 credits
Prerequisite: 622 or equivalent. Particle-particle interactions, mixing devices and design, theoretical hydrodynamics of suspensions of rigid particles, experimental studies of rheological behavior, phenomenological theories representing suspension behavior, dispersion of droplets to form an emulsion, phase morphology development and rheological properties of blends.
- 722 ADVANCED MODELLING OF POLYMER PROCESSING** 2 credits
Prerequisite: permission of instructor. Modelling of processing operations including extrusion molding, fiber and film processing, computer-aided design.
- 723 RHEOLOGY AND PROCESSING OF ELASTOMERS** 2 credits
Interpretation of rheological properties and critical study and analysis of processing operations including behavior in internal mixers, screw extruders, die systems and vulcanization molding.
- 724 ADVANCED EXTRUSION AND COMPOUNDING** 2 credits
Principles of operation and flow in single and twin screw extruders, screw design, characteristics of internal mixers, analysis and simulation of flow.
- 727 ADVANCED POLYMER RHEOLOGY** 2 credits
Prerequisite: 621 or equivalent. Second level course in non-linear constitutive equation for viscoelastic, viscoplastic, viscoelastic-plastic polymeric materials. Utility and applicability to polymer processing problems.
- 741 PHASE TRANSFORMATIONS IN POLYMERIC MATERIALS** 2 credits
Prerequisite: permission of instructor. Thermodynamics, nucleation and kinetics of growth of new phases, spinodal decomposition and related mechanisms, crystallization, crystal-crystal transformation, stress induced crystallization.
- 743 POLYMER BLENDS AND ALLOYS** 2 credits
Thermodynamics of miscibility and relationship to structure of components, compatibilizing agents, blending procedures, mechanical properties and structure-property relationships.
- 745 LIQUID CRYSTALS** 2 credits
Prerequisite: permission of instructor. Structure of low molecular weight and polymeric liquid crystals, characterization, physical properties including optical properties, phase transitions, structure-property relationships, processing of polymeric species.
- 771 BLOW MOLDING AND THERMOFORMING** 2 credits
Fundamentals of rubbery membrane heating and stretching. General blow molding and thermoforming concepts. Material structure-property development. Cooling and trimming to a final product.
- 797 ADVANCED TOPICS IN POLYMER ENGINEERING** 2-3 credits
(May be repeated) Prerequisite: permission of instructor. Advanced special topics intended for Ph.D. students in polymer engineering.
- 898 PRELIMINARY RESEARCH** 1-15 credits
(May be repeated) Prerequisites: completion of qualifying examination, approval of Student Advisory Committee. Preliminary investigation of Ph.D. dissertation subject.
- 899 DOCTORAL DISSERTATION** 1-15 credits
(May be repeated) Prerequisite: completion of candidacy examination of Student Advisory Committee. Original research by a Ph.D. candidate.

POLYMER SCIENCE 9871:

- 511 MOLECULAR STRUCTURE AND PHYSICAL PROPERTIES OF POLYMERS I** 3 credits
Prerequisite: 301 or 302 or permission. Interdisciplinary course involving the principles of chemistry and physics are brought to bear on relationships between molecular structure and chemical composition of macromolecules and their physical properties.
- 512 MOLECULAR STRUCTURE AND PHYSICAL PROPERTIES OF POLYMERS II** 2 credits
Prerequisite: 411/511 or permission. Mechanical characterization of polymeric materials, the Boltzmann superposition principle and fracture. Experimental techniques involving stress-strain behavior, stress relaxation, creep, forced and free vibrations discussed.
- 513 MOLECULAR STRUCTURE AND PHYSICAL PROPERTIES OF POLYMERS III** 2 credits
Prerequisite: 412/512 or permission. Deformation of bounded rubber units, the correspondence principle, time-dependent failure, mechanical properties of polymeric foams and design considerations discussed.
- 590 WORKSHOP IN POLYMER SCIENCE** 1-3 credits
(May be repeated with permission) Group studies on selected topics involving polymers. May not be used to meet undergraduate or graduate major requirements in polymer science. May be used for elective credit only.
- 601 POLYMER CONCEPTS** 2 credits
Prerequisites: 3150:264 and 3150:314 or equivalent courses or permission of instructor. Introduction to basic concepts in polymer science, including polymerization, copolymerization processes and naturally occurring polymers. Polymer nomenclature, definitions and classifications. Polymer stereochemistry and structure-property relationships.
- 602 SYNTHESIS AND CHEMICAL BEHAVIOR OF POLYMERS** 2 credits
Prerequisite: 601 or instructor's permission. Introduction to fundamentals and practical aspects of polymer synthesis and reactions of polymers; general knowledge of laboratory and commercial methods for polymer preparation; practical examples.
- 604 SPECIAL PROJECTS IN POLYMER SCIENCE** 1-3 credits
Prerequisite: permission. Research projects of limited nature assigned to student entering polymer science program. Intended to familiarize student with typical problems and techniques in this field.
- 605 POLYMER CHEMISTRY LABORATORY** 2 credits
Prerequisites: basic knowledge of organic chemistry and 602 or equivalent. The preparation and identification of polymers to illustrate different methods of polymerization such as step reactions and chain reaction.
- 607.8 POLYMER SCIENCE SEMINAR I AND II** 1 credit each
Prerequisite: limited to first- and second-year resident graduate students. Participants are to present a 25-minute lecture on some aspect of polymer science and to participate in discussions of lectures presented by other seminar participants.
- 610 INORGANIC POLYMERS** 2 credits
Prerequisite: 3150:472/572 or 3940:601 or permission. Survey course designed to broaden outlook of typical graduate student beyond chemistry and physics of carbon chains.

- 613 POLYMER SCIENCE LABORATORY** 3 credits
Prerequisites or corequisites: 601, 631, 674, or 701, or permission of instructor. Laboratory experiments in synthesis, characterization, physical properties and processing and testing of polymers.
- 615 LABORATORY COMPUTER APPLICATIONS IN POLYMER SCIENCE** 3 credits
Prerequisites: Basic knowledge of computer programming and permission of instructor. Laboratory use of computers in polymer science research for data acquisition, data analysis, graphing, and preparation of reports and thesis.
- 631 PHYSICAL PROPERTIES OF POLYMERS I** 2 credits
Prerequisite: permission of instructor. Thermodynamic and molecular basis of rubber elastic behavior; time-dependent mechanical properties of polymeric materials; melt-flow and entanglements; the morphology of crystalline polymeric materials; fracture of polymers.
- 632 PHYSICAL PROPERTIES OF POLYMERS II** 2 credits
Prerequisite: 631 or permission of instructor. Normal-coordinate theories of molecular motion and applications to time-dependent mechanical, electrical, and scattering properties of polymeric systems; time-temperature superposition; free volume, WLF relation; fracture; glass transition.
- 649 SYNTHESIS AND TECHNOLOGY OF ELASTOMERS** 2 credits
Prerequisites: 3150:264 or equivalent; permission of instructor. The preparation of both natural and synthetic elastomers. Emphasis on polymerization methods, polymer structure and methods of vulcanization. The modification of vulcanizates and these effects on physical characteristics of the elastomers described.
- 674 POLYMER STRUCTURE AND CHARACTERIZATION** 2 credits
Prerequisites: 3150:313 and 3150:314 or permission of instructor. Presentation of statistical description of polymer molecular properties including chain polymerization and degradation, characterization of conformation, molecular weight, local structure, crystal structures and ordering.
- 675 POLYMER THERMODYNAMICS** 2 credits
Prerequisite: 674 or permission of instructor. Presentation of the theories and experiments concerning polymer solutions, polymer phase equilibria, and polymeric phase transitions and dilute solution steady-state transport.
- 676 POLYMER CHARACTERIZATION LABORATORY** 2 credits
Prerequisite: 675 or permission of instructor. Laboratory analysis of polymers by fractionation, osometry, swelling, x-ray diffraction, microscopy, thermal analysis, spectroscopy and chromatography.
- 680 POLYMER PROCESSING** 2 credits
Prerequisite: permission. Study of process engineering in polymer conversion industry, emphasizing analytical treatment of heat transfer, mass flow, mixing, shaping and molding of polymeric materials.
- 681 DESIGN OF RUBBER COMPONENTS** 2 credits
Prerequisite: 4600:337 or equivalent. Principles of design of elastomeric products, emphasizing analytical treatments of elastic behavior and mechanisms of failure of resilient mountings, springs, seats, bearings and tires.
- 699 MASTER'S RESEARCH** 1-6 credits
Prerequisite: permission. For properly qualified candidate for master's degree. Supervised original research in polymer science, under direction of faculty member, followed by submission of thesis.
- 701 POLYMER TECHNOLOGY I** 2 credits
Principles of compounding and testing, processing principles and types of operation, design principles.
- 702 POLYMER TECHNOLOGY II** 2 credits
Prerequisite: 701 or permission of instructor. Rubber industry, rubber compounding and processing, vulcanization methods, physical testing, plastics preparation and compounding, manufacturing processes. Lecture/ laboratory.
- 703 POLYMER TECHNOLOGY III** 2 credits
Prerequisite: 702 or permission of instructor. Flow properties, extrusion, calendaring and milling, molding, mixing, bond operations, engineering properties, rubber springs, viscoelastic analysis design consideration. Lecture/laboratory.
- 704 CONDENSATION POLYMERIZATION** 2 credits
Prerequisite: 3150:463/563 or permission of instructor. Survey of the theory and practice of condensation polymerization. Numerous commercial examples are presented with special emphasis being placed on the properties and applications of polymers prepared by this technique. Structure-property relationships are highlighted for each major polymer class.
- 705 FREE RADICAL REACTIONS IN POLYMER SCIENCE** 2 credits
Prerequisite: 3150:463/563 or permission of instructor. Covers the kinetics and mechanisms of free radical initiated reactions encountered in polymer science, including polymerization methods, detailed considerations of the initiation, propagation and termination steps in vinyl polymerizations and copolymerization, preparation of block and graft copolymers by free radical initiated reactions and the mechanisms of free radical induced polymer degradation reactions.
- 706 IONIC AND MONOMER INSERTION REACTIONS** 2 credits
Prerequisite: 3150:463/563 or permission of instructor. Covers the scope, kinetics and mechanisms of polymerizations initiation by anions, carbenium ions and onium ions as well as polymerizations induced by coordination catalysts. Living polymerizations, molecular weights, molecular weight distributions, stereo-chemistry, solvent effects, counter-ion effects, temperature effects, Ziegler-Natta catalysis, olefin metathesis, functionalization of polymers, graft and block copolymer synthesis.
- 707 KINETICS OF POLYMERIC PROCESSES** 2 credits
Prerequisites: 632 and 675 or permission of instructor. Principles of kinetic theory and statistical mechanics are applied to apolymer diffusion, polymerization kinetics, polymer adsorption, membrane transport, polymeric phase transformations, gel formation and colloidal destabilization.
- 708 MACROMOLECULAR CHAIN STRUCTURE** 3 credits
Prerequisites: either 3150:314, 3650:301, or 4200:305 or permission. Chain-like structure of large molecules, fundamental theories of chemical conformation and statistical mechanics developed to degree that their applications to polymeric problems can be discussed.
- 708 MACROMOLECULAR CHAIN STRUCTURE** 3 credits
Prerequisite: 708 or permission. Continuation of topics in 708 including experimental techniques used in elucidation of chain structure.
- 711 SPECIAL TOPICS: POLYMER SCIENCE** 2 credits
Prerequisite: permission. Study of topical subjects of current interest in polymer science, encompassing chemistry, physics or engineering aspects of macromolecular substances and including laboratory work where applicable.
- 712 SPECIAL TOPICS: POLYMER SCIENCE** 2 credits
Prerequisite: permission. Topics of current interest in polymer science, encompassing chemistry, physics or engineering aspects of macromolecular science.
- 713 CHAIN STRUCTURE LABORATORY** 2 credits
Prerequisite or corequisite: 708 or permission of instructor. Designed to apply principles discussed in 708 to laboratory determination of polymer structure.
- 899 DOCTORAL RESEARCH IN POLYMER SCIENCE** 1-16 credits
Open to properly qualified students accepted as candidates for Doctor of Philosophy in Polymer Science depending on the availability of staff and facilities.

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WILLIAM V. MUSE, 1984-, B.S., M.B.A., Ph.D.

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*Deceased

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W. J. BANKES*, 1921-1931, M.A.
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 HJALMER W. DISTAD*, 1942-1944, Ph.D. (acting)
 HOWARD R. EVANS*, 1944-1958, Ph.D.
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 WILLIAM E. KLINGELE, 1989, Ed.D.

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 RUSSELL J. PETERSEN, 1989, Ph.D.

School of Law

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 ALBERT S. RAKAS, 1979-1981, J.D. (interim)
 DONALD M. JENKINS, 1981-1987, LL.M.
 ISAAC C. HUNT, JR., 1987, LL.B.

Graduate School

CHARLES BULGER*, 1933-1951, Ph.D., Litt.D. (Dean of Graduate Work)
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 ERNEST H. CHERRINGTON, JR., 1960-1967, Ph.D. (Dean of the Graduate Division)
 ARTHUR K. BRINTALL, 1967-1968, Ph.D. (Dean of Graduate Studies and Research)
 EDWIN L. LIVELY, 1968-1974, Ph.D. (Dean of Graduate Studies and Research)
 CLAIBOURNE E. GRIFFIN, 1974-1977, Ph.D. (Dean of Graduate Studies and Research)
 JOSEPH M. WALTON, 1977-1978, Ph.D. (Associate Dean of Graduate Studies and Research)
 ALAN N. GENT, 1978-1986, Ph.D. (Dean of Graduate Studies and Research)
 JOSEPH M. WALTON, 1986-1989, Ph.D. (Acting Dean of Graduate Studies and Research)
 PATRICIA L. CARRELL, 1989, Ph.D. (Dean of the Graduate School)

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 MARION A. RUEBEL, 1978-1989, Ph.D.
 NANCY K. GRANT, 1989-1990, Ph.D. (acting).
 THOMAS J. VUKOVICH, 1990, Ph.D. (acting)

Evening College

L. L. HOLMES, 1932-1934, M.A. (director)
 LESLIE P. HARDY, 1934-1953, M.S.Ed., L.H.D. (director)
 E. D. DURYEA, 1953-1956, Ed.D. (dean)
 D. J. GUZZETTA, 1956-1959, Ed.D., LL.D., D.S.Sc., L.H.D. (dean)
 WILLIAM A. ROGERS, 1959-1967, Ed.D. (dean)
 CHARLES V. BLAIR, 1967-1970, M.A. (dean)
 JOHN G. HEDRICK, 1970-1974, M.A. (dean)
 CAESAR A. CARRINO, 1974-1986, Ph.D. (dean)

Community and Technical College

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 ROBERT C. WEYRICK, 1974-1985, M.S.
 FREDERICK J. STURM, 1985-1987, Ed.D. (acting)
 JAMES P. LONG, 1987-1989, Ph.D.
 FREDERICK J. STURM, 1990, Ed.D.

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RAY H. SANDEFUR*, 1967-1978, Ph.D.
 GERARD L. KNIETER, 1978-1986, Ph.D.
 KELVIE C. COMER, 1986-1987, Ed.D. (acting)
 WALLACE T. WILLIAMS*, 1987-1991, Ph.D.
 DONALD E. HALL, 1991, Ph.D. (acting)

College of Nursing

ESTELLE B. NAES, 1967-1975, Ph.D.
 LILLIAN J. De YOUNG, 1975-1988, Ph.D.
 ELIZABETH J. MARTIN, 1988, Ph.D.

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MARVIN E. PHILLIPS, 1972-1974, M.A. (acting director)
 JOHN G. HEDRICK, 1974-1974, M.A. (director)
 JOHN G. HEDRICK, 1974-1979, M.A. (dean)
 ROBERT L. McELWEE, 1979-1980, M.A. (acting dean)
 TYRONE M. TURNING, 1980, Ed.D. (dean)

College of Polymer Science and Polymer Engineering

FRANK N. KELLEY, 1988, Ph.D. (dean)

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 WILLIAM J. BRITAIN, Ph.D., College of Polymer Science and Polymer Engineering (Term expires August 31, 1994).
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 JEFFREY C. DILTS, Ph.D., College of Business Administration (Term expires August 31, 1992).
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 HELEN RICHTER, Ph.D., College of Arts and Sciences (Term expires August 31, 1992).
 JOHN J. ZARSKI, Ph.D., College of Education (Term expires August 31, 1993).

Graduate Faculty***September 1991**

WILLIAM V. MUSE, *President; Professor of Marketing* (1984) B.S., Northwestern State University, 1960; M.B.A., Ph.D., University of Arkansas, 1966.
 ABDULLAH ABONAMAH, *Assistant Professor of Mathematical Sciences* (1989) B.S., University of Dayton; M.S., Wright State University; Ph.D., Illinois Institute of Technology, 1986.
 J. THOMAS ADOLPH, *Professor of Physical Education* (1969) B.A., The University of Akron; M.Ed., Ohio University; Ph.D., The Ohio State University, 1969.
 CAROLYN A. ALBANESE, *Associate Professor of Home Economics* (1978) B.S., Southern Illinois University at Carbondale; M.S., The Ohio State University, 1969.
 M. KAY ALDERMAN, *Professor of Education* (1979) B.S., University of Southern Mississippi; M.Ed., University of Texas-Austin; Ed.D., University of Houston, 1976.
 RALPH A. ALEXANDER, *Professor of Psychology* (1973) B.A., Arizona State University; M.A., Ph.D., University of Rochester, 1974.
 REENE A. ALLEY, *Assistant Professor of Education* (1989) B.S., Ball State University; M.A., Purdue University; Ed.D., Indiana University, 1981.
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 ALFRED ANDERSON, *Associate Professor of Music* (1985) B.M., Mississippi College; M.M., Indiana University, 1970.
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 MARK S. AUBURN, *Senior Vice President and Provost; Professor of English* (July 1991) B.S., B.A., The University of Akron; A.M., Ph.D., University of Chicago, 1971.
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*Deceased.

*The dates in parentheses indicate the beginning of service at The University of Akron; unless otherwise stated, service began in the month of September.

- ROGER J. BAIN**, *Associate Professor of Geology* (1970) B.S., M.S., University of Wisconsin; Ph.D., Brigham Young University, 1968.
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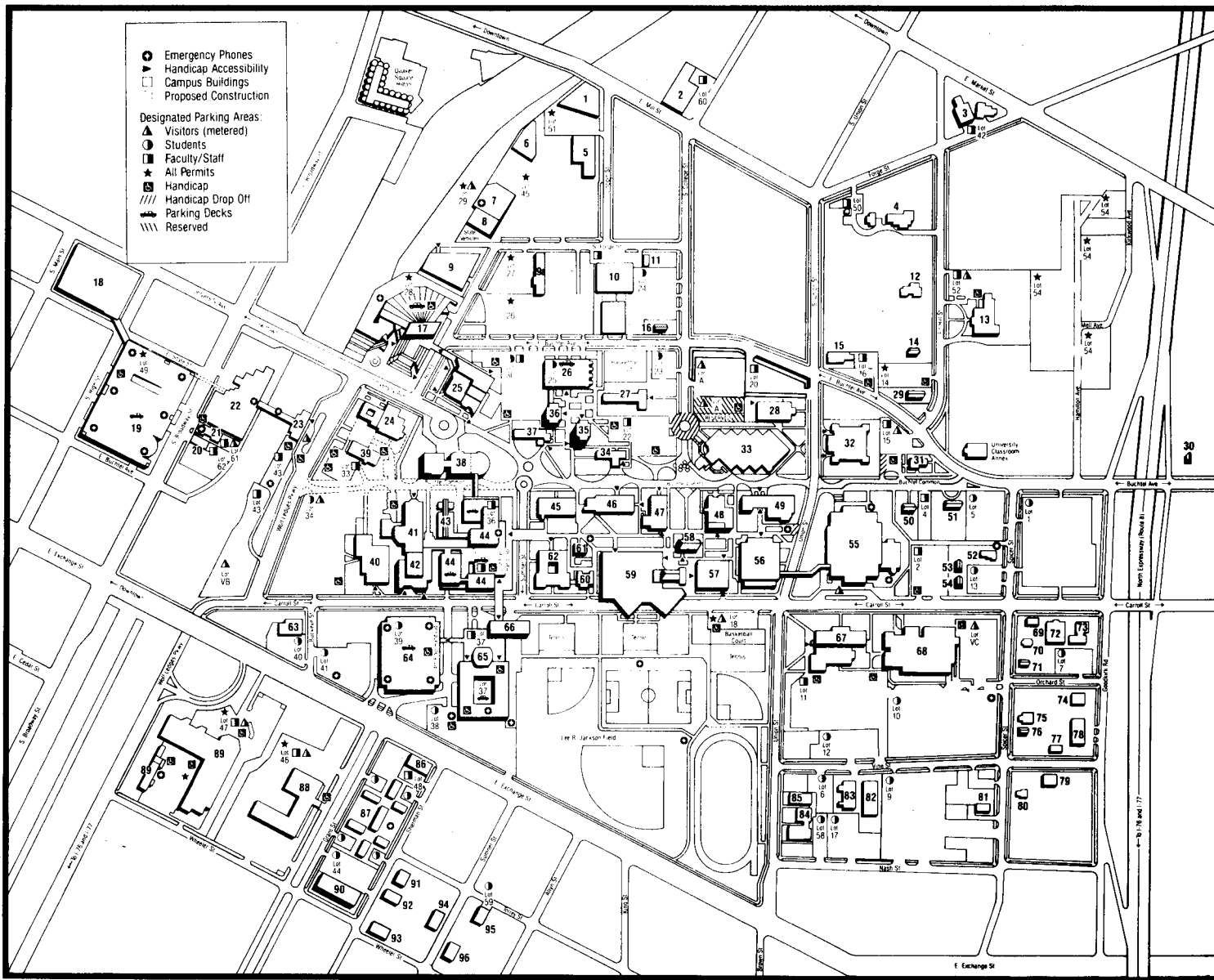
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