

Graduate Bulletin



Graduate School
1995-96

THE UNIVERSITY OF AKRON



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Calendar 1995-1996**Fall Semester 1995**

Day and Evening Classes Begin	Mon., Aug. 28
*Labor Day	Mon., Sept. 4
Veterans Day (classes held, staff holiday)	Fri., Nov. 10
**Thanksgiving Break	Thurs.-Sat., Nov. 23-25
Classes Resume	Mon., Nov. 27
Final Instructional Day	Sat., Dec. 9
Final Examination Period	Mon.-Sat., Dec. 11-16
Commencement	Sat., Dec. 16
Spring Intersession	Tues.-Sat., Jan. 2-13, 1996

Spring Semester 1996

*Martin Luther King Day	Mon., Jan. 15
Day and Evening Classes Begin	Tues., Jan. 16
*Presidents' Day	Mon., Feb. 20
Spring Break	Mon.-Sat., Mar. 18-23
***May Day	Fri., May 3
Final Instructional Day	Sat., May 4
Final Examination Period	Mon.-Sat., May 6-11
Commencement	Sat., May 11
Summer Intersession	Mon.-Fri., May 13-June 7
Commencement for Law School	Sat., May 18

Summer Session I 1996

First 5- and 8-Week Sessions Begin	Mon., June 10
*Independence Day	Thurs., July 4
First 5-Week Session Ends	Fri., July 12

Summer Session II 1996

Second 5-Week Session Begins	Mon., July 15
8-Week Session Ends	Fri., Aug. 2
Second 5-Week Session Ends	Fri., Aug. 16
Summer Commencement	Sat., Aug. 17

Fall Semester 1996

Day and Evening Classes Begin	Mon., Aug. 26
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The *Graduate Bulletin* is a supplement to The University of Akron *Undergraduate Bulletin*. The *Undergraduate 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 *Undergraduate Bulletin* contact the Office of Admissions, The University of Akron, Akron, OH 44325-2001. (216) 972-7100, or toll-free, (800) 655-4884.

Inquiries

Address inquiries concerning:

Graduate study to the Graduate School, The University of Akron, Akron, OH 44325-2101. (216) 972-7663.

Admissions information, campus tours, and housing, transfer of credits to the Office of Admissions, The University of Akron, Akron, OH 44325-2001. (216) 972-7100.

Financial aid, scholarships, loans, and student employment to the Office of Student Financial Aid, The University of Akron, Akron, OH 44325-5201. (216) 972-7032.

Athletics to the Athletic Director, The University of Akron, Akron, OH 44325-6211. (216) 972-7080.

Registration, scheduling, residency requirements, and veteran's affairs to the Office of the Registrar, The University of Akron, Akron, OH 44325-6211. (216) 972-7844.

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

University Closing Policy

The University President, or designee, upon the recommendation of the Associate Vice President for Administrative Support Services-Operations will determine when conditions—such as severe weather or a state of emergency—necessitate closing the entire University or cancelling classes at the main campus and/or Wayne College in Orville.

The Associate Vice President for Administrative Support Services-Operations will promptly notify other designated University officials and members of the Department of University Communications, who will contact area media. University colleges/departments/schools are encouraged to establish a method for communicating the closing decision to departmental personnel.

Cancellation of classes and closure announcements will be made as early as possible in the day and will clearly state the affected campus(es) to avoid confusion. Call 972-SNOW or 972-6238 (TDD/Voice) for updated information.

*Classes cancelled

**Classes cancelled from Wednesday at 5 p.m. until Monday 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, programs may be modified due to limited resources or facilities, unavailability of faculty, insufficient enrollment, or such other reasons as the University deems necessary.

The University of Akron Graduate Bulletin
(USPS 620-400)

Vol. XXXIV

POSTMASTER

July 1995

Send address changes to The University of Akron *Graduate Bulletin*, Graduate School, The University of Akron, Akron, OH 44325-2101.



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Background information

Background

HISTORY

The 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 urban state-assisted 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 that 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.

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), and Nursing (1967).

Considering the institution's location in the heart of a 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 world's first College of Polymer Science and Polymer Engineering (1988), now the largest academic polymer program in the world. 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. The University's polymer programs have produced some of the world's most able scientists and engineers, and today attract millions of dollars annually in research support, as well as top graduate students from around the world.

But research, innovation, and creativity actively take many forms at the University—in the sciences and in the arts and humanities. Today, UA faculty study ways of matching workers with jobs to maximize performance; they develop new ways to synthesize fuel; they write and produce plays, pen poetry, choreograph dance works; they explore improved methods of tumor detection; they evaluate the quality of water in Northeast Ohio; they provide speech and hearing therapy to hundreds of clients; and they study political campaign financing and reform. UAs 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. As early as 1914, nine University engineering students headed out into Akron factories, initiating one of the country's first engineering cooperative education programs. World War I-era students included the nation's first female students to co-op in a commercial job.

The University has a long tradition of serving the needs of part-time and full-time students through day and evening classes, and it attracts traditional-age students and adult "New Majority" students of all economic, social, and ethnic backgrounds. Committed to a diverse campus population, the University is at the forefront of all Ohio universities in recruiting and retaining minority students.

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 14 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, over 26,000 students from 43 states and 64 foreign countries are enrolled in its 10 degree-granting units. The University of Akron is among the 50 largest in the nation and boasts the third-largest principal campus enrollment of Ohio's state universities. The University offers a comprehensive aca-

ademic package featuring select programs unsurpassed nationally and internationally. Alumni of the University number more than 92,000 and include scientists, engineers, artists, lawyers, educators, nurses, writers, business people, and other professionals at work in every state and 84 foreign countries.

The 170-acre main campus with 76 buildings is within walking distance of downtown Akron and is located in a metropolitan area of 2.8 million people. The University's presence in Northeast Ohio 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. Located on campus, the Ohio Ballet, Emily Davis Art Gallery, University Orchestra, Opera/Musical Theatre, concerts, recitals, choral programs, Touring Arts Program, University Theatre, Repertory Dance Company, and professional artists performing at E.J. Thomas Performing Arts Hall contribute to the University's rich cultural environment. The University has achieved a position of prominence in a number of intercollegiate sports. Having joined the Mid-American Conference in 1991, the University participates on the NCAA Division I level in 17 sports.

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, 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, and our world.

MISSION STATEMENT

The University of Akron, a publicly assisted urban institution, strives to develop enlightened members of society. It offers comprehensive programs of instruction from associate through doctoral levels; pursues a vigorous agenda of research in the arts, sciences and professions; and provides a service to the community. The University pursues excellence in undergraduate and graduate education, and distinction in selected areas of graduate instruction, inquiry, and creative activity.

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 Akron campus covers 170 acres and includes 76 buildings. Plans have been made 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, features park-like pedestrian areas. 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 is available from the Cleveland-Hopkins International Airport and the Akron-Canton Regional Airport, south of Akron.

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:

Admission Building. 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 Dr. 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, including the dean's office, the Engineering Co-op Office; Mechanical, Electrical, Chemical, and Civil Engineering; as well as the Department of Biology, the \$2 million biology research facility, and the science and engineering holdings of University Libraries.

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 School of Dance, the Ohio Ballet, and the Dance Institute.

Bierce Library. Named for General Lucius V. Bierce, an Akron mayor, lawyer, historian, state senator, philosopher, philanthropist, and soldier, the building opened in the spring of 1973. In addition to the book and periodicals collections, the facility houses audio-visual materials, maps, and microforms. University Libraries, including science and technology materials located in the Auburn Science and Engineering Center, have 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 campus, Buchtel Hall was completely restored in 1973 following a devastating fire in 1971. It is the University's link with its predecessor, Buchtel College. It provides office space for numerous administrative officials of the University.

Buckingham Center. This building houses a Cultural Diversity Center, which includes the Black Cultural Center, Peer Counseling Program, Diversity Council, and a repository of African-American history.

Business Administration Building. This \$9.1 million facility, located at 259 South Broadway, was completed in 1991. The structure consolidates office, classroom, and laboratory facilities for the dean of the College of Business Administration, the George W. Daverio 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 and Planning, Developmental Programs, Institutional Research, and the academic computer testing facility, as well as the University's Network Services and Electronic Systems operation.

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 Information Services offices, main computers, and workrooms, as well as student and faculty microcomputer labs and time-sharing terminals.

Computer Store. Just west of the Gardner Student Center, the Computer Store is operated by Information Services.

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

E.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 theater productions, the hall is a masterpiece in architecture, acoustics, and creative mechanisms. It stands at the corner of University Avenue and Hill Street.

Fir Hill Center. This building, north of East Buchtel Avenue at Fir Hill, houses the offices of the Office of Alumni Relations.

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

Folk Hall. This building, at 150 East Exchange Street, provides modern, well-equipped School of Art facilities. Studios are available for graphic arts, photography, drawing, painting, metalsmithing, ceramics, and weaving. The Emily 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, computer lab, and classroom space.

Gallucci Hall. This building, at 200 East Exchange Street, formerly a Holiday Inn, is a coed residence hall and home to the Honors Program and honors students. It also provides temporary quarters for the Hospitality Management Department and the *Crystal Room* dining facility.

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 in 1955, and later, in 1959, was 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 Gardner Theatre, a cafeteria, and other dining facilities.

Mary E. Gladwin Hall. Housing the College of Nursing and biology laboratories, this building was named in honor of distinguished alumna Mary E. Gladwin (1887), who rendered unparalleled service to the nation during World War I. The \$10 million complex opened in 1979 and includes the administrative offices of the College of Nursing, faculty offices, the Center for Nursing, a Learning Resources Center that includes patient care simulation areas, an audio-visual center, and a state-of-the-art computer learning center.

Guzzetta Hall. Complementing the E.J. Thomas Performing Arts Hall, this facility was constructed directly across 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 Arts and Music. In addition to providing more than 40 student practice rooms, the complex houses radio and television studios, WZIP-FM, a small experimental theater, 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, this 19th century mansion has been designated 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 at Buchtel College as early as 1909. Opened in 1979, the building houses the Department of Chemistry and features numerous innovative laboratories with the latest, most sophisticated safety equipment, along with classrooms and faculty and administrative offices.

Kolbe Hall. This building, named for the first president of the Municipal University of Akron, Parke R. Kolbe, is soon to be remodeled for the School of Communication, Radio Station WZIP, and a proposed long-distance learning facility. It also houses the University Theatre.

Leigh Hall. Named in honor of Warren W. Leigh, first dean of the College of Business Administration, this facility on Buchtel Common currently houses the John S. Knight Auditorium and interim space for School of Communication faculty (during the 1995-96 Kolbe Hall Construction Project).

Paul E. Martin University Center. Located at 105 Fir Hill, the Paul E. Martin University Center has 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 Development is located on the upper floors of the building.

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 law library, classrooms, moot courtroom, appellate-review office, seminar rooms, and faculty offices. A \$2.8 million addition provides library and support space, and a \$1.5 million second expansion has linked McDowell Law Center to West Hall, providing additional administration office space. The law complex 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 Physical and Health Education, a main gymnasium, a gymnastics area, a combatives area, a motor learning lab, a human performance lab, an athletic training lab for sports medicine, a weight training and fitness center, an athletics batting cage, the intramurals sports office, and classrooms.

North Hall. Located on South Forge Street, this building houses, on a temporary basis, supplemental service space for the campus police department.

Ocasek Natatorium. The \$6 million natatorium, completed in 1988, is a 70,000-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 Office of the Dean of the Buchtel College of Arts and Sciences and the following departments and institutes: Classics, Economics, English, General Studies, History, Modern Languages, Political Science, Philosophy, Sociology, the Ray C. Bliss Institute of Applied Politics, and the English Language Institute. The complex is at the corner of Buchtel Common and South Union Street.

100 Lincoln Street Building. This building houses the Purchasing Department and Network Services, and Telecommunications Department offices, as well as the office of the University Architect and Senior Director of Facilities Planning, and the Office of the Director of Space Utilization.

108 Fir Hill. This former Girl Scout regional headquarters building has been renovated to accommodate the University's Center for Child Development.

143 Union Street Building (Newman Center). This recently purchased building provides administrative office space for the University treasurer, budget director, the payroll department, and Information Services' network services group.

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, located at 146 Hill Street, houses physical facilities offices, craft shops, the central heating and cooling distribution center, and the Campus Police/Security Department.

The Polsky Building. The largest academic building in Ohio, this renovated downtown department store is home to the Community and Technical College dean's office, and the departments of Business Technology, Public Service Technology, Allied Health Technology, and Associate Studies. Also located here are the Graduate School, University Archives, the Archives of the History of American Psychology, the School of Communicative Disorders and its Speech and Hearing Center, the Department of Public Administration and Urban Studies, the Center for Urban Studies, the School of Social Work, the University of Akron Service Consortium office, and the offices of Research Services and Sponsored Programs. A fast-food service facility and a campus bookstore are in operation on the High Street level (third floor).

Polymer Science Building. Construction of the \$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 Rubber Division of 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 at 248 East Buchtel Avenue has a cafeteria and dining room for 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, four miles from 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, longtime 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 the office of the president of the Faculty Senate, other offices, and classroom space. Schrank Hall South provides facilities for the School of Home Economics and Family Ecology, the Community and Technical College's Engineering and Science Technology Division, and the Army and Air Force ROTC.

Simmons Hall. Named for Heztleton Simmons, University president from 1933 to 1951, this hall houses the University Counseling and Testing Center and the Department of Psychology. The Institute for Life-Span Development and Gerontology occupies a portion of the building. A student interested in employment counseling and assistance will find the Placement Services office in this facility.

Spicer Hall. This major student services building, renovated in 1975, houses the Registrar's Office, Academic Advisement Center, the Office of Student Financial Aid, University College, the Office of Services for Students with Disabilities, and the Student Assistance Center, as well as the Parking Systems office, and offices for the University Controller, the University Auditor and External Auditor, and Accounts Payable and Receivable.

277 Broadway Street Building. This building provides administrative space for the Office of Human Resources, including benefits, employment services, labor and employee relations, and personnel services, as well as the Department of University Communications.

225 East Mill Street. This building is home to the Akron Polymer Training Center, an instructional classroom and laboratory facility for Polymer Engineering and Engineering and Science Technology Polymer Science classes.

West Hall. This renovated structure on Wolf Ledges Parkway is part of the McDowell Law Center.

Whitby Hall. Named for G. Stafford Whitby, a pioneer in the development of polymer science, this building opened in 1975. Housed in this facility are some polymer science laboratories and the Department of Chemical Engineering.

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 245, general classrooms, a handicrafts room, a teaching demonstration classroom, a microteaching laboratory, educational media lab, and the Student Teaching Office.

Facilities and Equipment

The University's addition of modern teaching aids demonstrates its recognition of the need, in this technological age, for up-to-date facilities and equipment. Some of these facilities are described below.

INFORMATION SERVICES

The **Department of Information Services** is responsible for computing, network services, and telecommunications throughout the campus. The department is made up of three sections: Academic User Services provides computing support to academic research and instruction efforts. Networking Services provides support for all of the University's voice and data communications and networking, and Computer Services provides the mainframe hardware and software support for the University as well as applications development support for the University's administrative business. The majority of the department is located in the Computer Center at the west end of the central campus with portions of the networking and telecommunications groups located in the Union Building, the Lincoln Building, and Carroll Hall.

The Academic User Services section of Information Services provides support for academic and instructional computing and assists the student and faculty member in making effective use of the Computer Center. This section supports the acquisition and implementation of prepackaged programs for specific departments and provides consultation on problems requiring numerical analysis. The Computer Based Education and Testing (CB&T) group within the Academic User Services section develops and/or acquires specialized instructional programs. Many of these programs are tutorial in nature and are designed to assist the student in learning a particular idea or principle. The CB&T group also supports the Testing Center, which provides the capability for students to take course tests via a computer.

For mainframe computing, Information Services utilizes an IBM 4381-R14 running VM-HPO as the operating system and an IBM 3090-200 dyadic processor running MVS-XA. The IBM 4381-R14 is used by faculty and students for interactive computing and allows academic users to submit batch jobs to the IBM 3090-200 over a channel-to-channel adapter. The IBM 3090-200, in addition to being a shared processor for academic and administrative batch computing and administrative interactive computing, has a vector processor that does parallel processing in support of academic supercomputing. In addition to the two IBM machines, there is a DECsystem 5000/240 running Ultrix that is primarily used by Computer Science and Engineering.

The library has two Digital processors on the Computer Center platform, a DECsystem 5000/240 and a DECsystem 5900. Both processors are running the Innovative Interfaces Inc. library system and are part of the Ohio Library Information Network (OhioLINK).

All of the mainframe computers as well as many of the campus's microcomputer labs, faculty members' offices, and administrative offices are connected via Zippy's Internet Protocol network (ZIPnet). This is a high-speed data network available across campus which has a connection to OARnet, the statewide network. It provides access to Internet, the worldwide network, and the Ohio Supercomputer Center in Columbus.

Primary access to the mainframe computers is by work stations utilizing ZIPnet or by remote terminals. The peripheral equipment attached to the mainframes includes high-speed laser and impact printers, high-capacity disk drives, magnetic tape drives, a microfiche printer, and a voice-response system used for telephone registration. Plotting is supported using either a CalComp Pen Plotter or a CalComp Drawingmaster. An NCS OpScan 21-75 Optical Mark Sense Reader scans mark sense forms providing fast and reliable data entry for test scoring services, surveys, faculty evaluations, and payroll time cards. Information Services also supports widely used computer languages such as FORTRAN, C, COBOL, PL/I, BASIC, PASCAL, SAS, SPSS, and APL, and microcomputer packages such as Lotus, WordPerfect, dBase, and Harvard Graphics.

UNIVERSITY LIBRARIES

Library facilities are housed in three separate locations: in Bierce Library on Buchtel Common; the Science Library is in Auburn Science and Engineering Center, Room 104; and Archival Services is in the Polsky Building, lower level.

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 from other libraries through the OhioLINK network or other resource-sharing arrangements. 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 nearly 5,000 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 Ohio Library and Information Network, 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 Bierce Library and in the Science Library. Group study rooms and typing facilities are also in Bierce Library.

Audio-Visual Services, located in Bierce Library, Room 63B, maintains an extensive centralized collection of media hardware and audio-visual resources for student and faculty use. It also has a collection of instructional materials in various media formats (filmstrips, slides, etc.) to supplement classroom instruction.

Student Affairs

COUNSELING AND TESTING CENTER

In addition to participating with the Placement Office in the Career Development Service, the Counseling and Testing Center provides a wide range of psychological counseling, therapy, testing, and outreach and consulting services to the University community. The Center is located in 163 Simmons Hall, (216) 972-7082.

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 career guidance and information systems, SIGI and OCIS.
- *Personal-emotional counseling* deals within a short-term framework, with feelings of loneliness, inadequacy, guilt, anxiety, and depression; harmful involvement with alcohol and drugs; recovery from acquaintance or stranger rape; interpersonal relationships, especially with the immediate family, intimate relationships, 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 well-being, 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. Additionally, 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 including learning disability determination, advanced placement testing for course credit (CLEP), placement testing in mathematics, foreign language, reading and writing, and national testing programs. National testing includes pre-college tests (ACT, SAT, and OTSA), pre-graduate school tests (Millers Analogy Test, LSAT, GRE) and Education certification tests (PPST and NTE).

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

STUDENT HEALTH SERVICES

Health service facilities are located in Robertson Dining Hall, immediately adjacent to the residence halls. This facility is capable of handling most acute illnesses and injuries. Sick call hours are 9:00 to 11:30 a.m. and 1:00 to 2:30 p.m., and 6:00 to 7:00 p.m. most evenings (call first for evening service).

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 University Police or 911 immediately. The University assumes no legal responsibility or obligation for the expenses of such transportation or for medical services at the hospital.

Student Health and Accident Insurance, designed specifically for students, 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 and Immunization Record form are 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.

SERVICES FOR STUDENTS WITH DISABILITIES

According to provisions outlined in Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act, students with disabilities are ensured equal access and reasonable academic adjustments and accommodations by institutions of higher learning.

The Office of Services for Students with Disabilities is part of the Student Assistance Center in the Division of Student Affairs. It is the responsibility of this office to provide students with disabilities the necessary services that will ensure the opportunity for full participation in University academic programs, activities, and services.

If a student has a specific disability, he or she should contact the Office of Services for Students with Disabilities, Spicer Hall 124, (216) 972-7928 (voice) or (216) 972-5764 (TDD).

CENTER FOR CHILD DEVELOPMENT

The University of Akron Center for Child Development provides a variety of early childhood programs which are open to students, faculty, staff, and the community. Each classroom is staffed with a Pre-K certified teacher and student aides. Opportunities are provided for the children to engage in developmentally appropriate activities in the following areas: creative art, language arts, music and rhythms, science exploration, gross motor and fine motor development, socio-dramatic play, multi-sensory activities, and computer experience. The program emphasizes the development of a positive self concept through an anti-bias curriculum.

The Center for Child Development is open during the Fall and Spring semesters of the academic year between 7:30 a.m. and 6:00 p.m. Monday through Friday. The program offers hourly flextime and half day programs for children three to five years old and toilet trained. Full-day sessions are available year round for children two-and-a-half to five years old and toilet trained.

A summer pre-school flextime program is offered Summer Session I.

A summer program is also offered for school-aged children. This program is offered during summer sessions I and II from 7:00 a.m. until 6:00 p.m.

For more information call the Center for Child Development, (216) 374-8761.

GARDNER STUDENT CENTER

The Gardner Student Center, located in the center of campus, serves the students, faculty, and staff, and is one of the University's major assets in meeting the University-wide goal of public service. This busy facility houses four food service facilities, meeting rooms, lounges, Gardner Theatre, student organization offices, recreation facilities, the Communication Center, a bank, Ticketmaster/Film Center, and a bookstore.

- **Food Areas** in the Gardner Student Center offer a variety of food items. On the first level, the Chuckery features the services of a fast-food operation, a pizza and Mexican shop, and an ice cream and yogurt shop. For more of a cafeteria-style offering, the Hilltop, on the second level, provides full meals, a salad bar, soup, and daily specials.

- **Gardner Theatre** operates Tuesday through Sunday with two showings of first-run movies each day.
- The **Game Room**, located on the lower level of the Gardner Student Center, is open seven days a week for the convenience of the University family to enhance free time activity. The Game Room offers eight bowling lanes, 16 billiard tables, foosball, and a variety of video games. For the competitive individual, tournaments in many of these recreational activities are programmed each semester by the Game Room staff.
- The **Communication Center**, located in the lobby of Gardner Student Center offers the following services: informational and referral services; copying, including color; oversized and reduced copies; binding of materials; mailing facilities for campus and U.S. mail; literature distribution; and class support files.
- The **Ticketmaster/Film Center**, located in the lobby of Gardner Student Center (216) 972-6684, sells tickets to most events in northern Ohio, including Blossom Music Center, the Coliseum, The IX Center, Playhouse Square, Public Hall, and the Stadium. Over-the-counter sales include tickets to campus functions, including sporting events, and to local shows. Film and film processing services are also available.
- **The Bookstore at The University of Akron** is operated as a service of Barnes & Noble Bookstores, Inc. of New York City. Barnes & Noble operates 300 other college stores. The primary purpose of the Bookstore is to make available books and supplies required for course work. In addition, the store also carries a wide range of classroom supplies, paperbacks, engineering and art supplies, greeting cards, University memorabilia, clothing and other sundry items.

Graduate School

Charles M. Dye, Ph.D., *Interim Dean*
 Lathardus Goggins, Ph.D., *Associate Dean*
 Karen L. Caldwell, *Secretary to the Dean and Coordinator of
 Graduate Financial Aid*
 Virginia K. Donnelly, B.A., *Program Completion Coordinator*
 Brenda J. Henry, *Admissions Coordinator*
 Dolli Q. Markovich, B.A., *Coordinator of the Graduate School*

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. Dr. Charles M. Dye was named Interim Dean in 1993.

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 graduate 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, communication, 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, geography, history, home economics and family ecology, management, mathematics, mechanical engineering, music, nursing, nutrition/dietetics, philosophy, physics, political science, polymer engineering, polymer science, psychology, public administration, social work, 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.

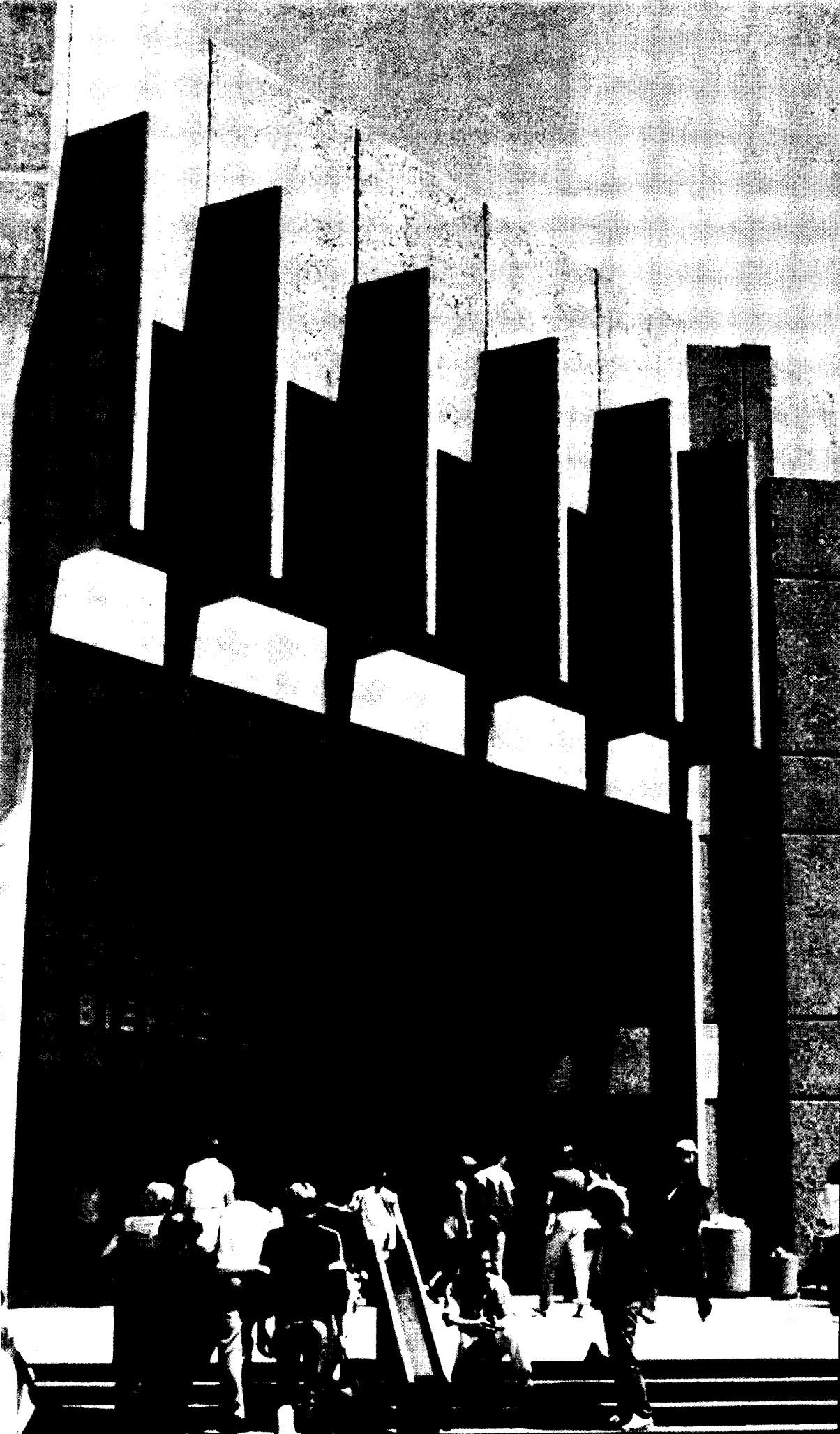
The objectives of GSG are to govern graduate student affairs, represent graduate student sentiment, and promote interdepartmental social exchange and interaction between students. These objectives are met by appointing members to participate in various administrative committee meetings, such as the Faculty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

Anyone wishing more information or anyone who wants to air a complaint, problem or suggestion concerning graduate students may contact the Graduate School 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*.

2

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 first-time application to the Graduate School must be accompanied by an application fee. The fee for **domestic** students is \$25. The fee for **international** students is \$50.

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.

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.

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.

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.

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 (2.74-2.5 overall GPA or 2.75 over the last two years). 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 interest 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.

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; or as defined by the Internal Revenue Service for those students with graduate assistantships.

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.

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 \$5,600 to \$18,000 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.

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:

3300:507 Middle English Literature

In the above example, the first four digits of the number (3300) indicate the college and department. In the case, 3000 represents the Buchtel College of Arts and Sciences; 300 refers to the Department of English. The second set of digits (507) 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:

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.

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.

*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.

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.

Thesis and Dissertation Credits

Course number 699 will only be used for courses which indicate credit is being given for a master's thesis. 899 will only be used for courses which indicate credit is being given for a doctoral dissertation. No credit for 699 or 899 will be given unless the thesis or dissertation is completed.

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.

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.

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.

Fees

All fees reflect charges in 1994-95 and are subject to change without notice.

Application Fee (this fee is not refundable under any circumstances)

Domestic	\$25
International	\$50

Tuition Fees

Resident student per credit	\$153.90
Nonresident student per credit	\$287.70

(same fees apply when auditing classes)

General Fee

1-12 credits per semester	\$5.50 per credit
13 credits and over per semester	\$70.70 per semester

Parking Permit Fee

5 or more credits per semester	\$57.50
4½ or fewer credits per semester	\$34.50
One summer session	\$20.50
Workshop participants	\$2 per day up to \$16

Graduation Fees

Each degree (except law)	\$30
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Other Fees

Thesis and binding
(payable at time of application for degree)
binding per volume \$9.50

Microfilming (Ph.D./Ed.D. only)
(payable at time of application for degree) \$60.00

Copyright Fee \$35
(payable at time of application for degree if copyright is sought)

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 graduate 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			
3100:500	Food Plants	2	\$ 10
3100:521	Tropical Field Biology	4	\$175
3100:522	Conservation of Biological Resources	4	\$ 5
3100:524	Freshwater Ecology	3	\$ 15
3100:526	Applied Aquatic Ecology	3	\$ 15
3100:533	Pathogenic Bacteriology	4	\$ 50
3100:535	Virology	4	\$ 50
3100:537	Immunology	4	\$ 50
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
3100:548	Economic Botany	2	\$ 5
3100:551	General Entomology	4	\$ 10
3100:553	Invertebrate Zoology	4	\$ 25
3100:554	Parasitology	4	\$ 15
3100:556	Ornithology	4	\$ 15
3100:558	Vertebrate Zoology	4	\$ 10
3100:561	Human Physiology	4	\$ 25
3100:562	Human Physiology	4	\$ 25
3100:564	General and Comparative Physiology	4	\$ 50
3100:566	Vertebrate Embryology	4	\$ 30
3100:567	Comparative Vertebrate Morphology	4	\$ 25
3100:580	Radiation Biology	3	\$ 15
3100:625	Prokaryotic DNA Technique	4	\$ 10
3100:682	Eucaryotic Techniques DNA	3	\$ 15
3100:684	Eucaryotic Techniques RNA	3	\$ 15
3100:685	Animal Cell Culture	4	\$ 50
3100:688	Principles of Transmission Electron Microscopy	3	\$ 20
3100:689	Principles of Scanning Electron Microscopy	3	\$ 20
3150:505	Biochemistry Laboratory	2	\$ 25
3250:527	Economic Forecasting	3	\$ 10
3250:626	Statistics for Econometrics	3	\$ 10
3250:627	Econometrics	3	\$ 10
3250:628	Seminar: Research Methods	3	\$ 10
3350:505	Geographic Information Systems	3	\$ 10
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	\$ 10
3350:548	Automated Computer Mapping	3	\$ 10
3350:549	Advanced Remote Sensing	3	\$ 10
3350:595	Soil and Water Field Studies	3	\$ 10

3370:510	Regional Geology of North America	3	\$25
3370:511	Glacial Geology	3	\$25
3370:521	Coastal Geology	3	\$25
3370:525	Advanced Stratigraphy	3	\$25
3370:532	Optical Mineralogy and Introductory Petrography	3	\$25
3370:533	Advanced Petrography	3	\$25
3370:535	Petroleum Geology	3	\$25
3370:536	Coal Geology	3	\$25
3370:537	Economic Geology	3	\$25
3370:541	Fundamentals of Geophysics	3	\$15
3370:546	Exploration Geophysics	3	\$15
3370:550	Advanced Structural Geology	3	\$25
3370:563	Micropaleontology	3	\$25
3370:570	Geochemistry	3	\$25
3370:574	Groundwater Hydrology	3	\$25
3370:608	Remote Sensing in Geology	3	\$15
3370:610	Applied Quantitative Geomorphology	3	\$15
3370:623	Carbonate Petrology	3	\$15
3370:614	Siliciclastic Sedimentology	3	\$15
3370:631	Rocks and Minerals	4	\$15
3370:632	Igneous Petrology	3	\$15
3370:633	Metamorphic Petrology	3	\$15
3370:634	Clay Mineralogy	3	\$15
3370:638	Ore Microscopy	3	\$15
3370:639	Nuclear Geology	3	\$15
3370:643	Geostatistics	3	\$15
3370:649	Borehole Geophysics	3	\$15
3370:656	Global Tectonics	3	\$15
3370:674	Advanced Ground Water Hydrology	3	\$15
3370:675	Geochemical Methods of Prospecting	2	\$15
3370:678	Urban Geology	3	\$15
3450:527	Introduction to Numerical Analysis	3	\$ 5
3450:528	Numerical Linear Algebra	3	\$ 5
3450:529	Numerical Solutions: Ordinary Differential Equations	3	\$ 5
3450:530	Numerical Solutions: Partial Differential Equations	3	\$ 5
3450:535	Systems of Ordinary Differential Equations	3	\$ 5
3450:627	Advanced Numerical Analysis I	3	\$ 5
3450:628	Advanced Numerical Analysis II	3	\$ 5
3450:629	Matrix Computations I	3	\$ 5
3450:630	Matrix Computations II	3	\$ 5
3450:635	Optimization	3	\$ 5
3460:506	Introduction to C and UNIX	3	\$15
3460:518	Introduction to Discrete Structures	3	\$10
3460:520	Structured Programming	3	\$10
3460:526	Operating Systems	3	\$15
3460:528	UNIX System Programming	3	\$15
3460:530	Theory of Programming Languages	3	\$10
3460:535	Analysis of Algorithms	3	\$10
3460:540	Compiler Design	3	\$10
3460:555	Data Communications and Networks	3	\$20
3460:557	Computer Graphics	3	\$20
3460:560	Artificial Intelligence and Heuristic Programming	3	\$10
3460:565	Computer Organization	3	\$10
3460:567	Microprocessor Programming and Interfacing	3	\$10
3460:570	Automata, Computability, and Formal Languages	3	\$10
3460:575	Data-Base Management	3	\$15
3460:589	Topics in Computer Science	1-3	\$15
3460:610	Symbolic and Numeric Methods	3	\$15
3460:626	Advanced Operating Systems	3	\$25
3460:635	Advanced Algorithms and Complexity Theory	3	\$25
3460:640	Advanced Compiler Design and Construction	3	\$25
3460:655	Computer Networks and Distributed Processing	3	\$25
3460:657	Advanced Computer Graphics	3	\$25
3460:660	Theory of Expert Systems	3	\$25
3460:655	Advanced Computer Architecture	3	\$25
3460:667	Parallel Processing	3	\$25
3460:670	Advanced Automata and Computability	3	\$25
3460:675	Advanced Database Management	3	\$25
3460:680	Software Engineering	3	\$25
3470:561	Applied Statistics I	4	\$ 5
3470:562	Applied Statistics II	3	\$ 5
3470:580	Statistical Computer Applications	3	\$10
3470:663	Experimental Design	3	\$ 5
3470:665	Regression and Correlation	3	\$ 5
3470:666	Nonparametric Statistics-Methods	3	\$10
3470:667	Factor Analysis	3	\$10
3470:668	Multivariate Statistical Methods	3	\$ 5
3470:675	Response Surface Methodology	3	\$10
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	\$15
3980:601	Advanced Research and Statistical Methods	3	\$15
3980:674	Analytical Techniques for Public Administrators	3	\$15
3980:706	Program Evaluation	3	\$15

College of Engineering

All graduate-level courses in the College of Engineering are assessed a \$30 fee with the exception of the following courses:

4200:566	Digitized Data and Simulation	3	\$60
4300:523	Chemistry for Environmental Engineers	3	\$30
4400:555	Microwaves	4	\$50
4400:565	Computer Circuits	4	\$50
4400:572	Control Systems II	4	\$50
4400:584	Power Electronics Laboratory and Design Project	2	\$50
4600:563	CAD/CAM	3	\$50
4800:601	Biomedical Instrumentation I	4	\$50
4800:620	Neural Networks	3	\$50

4800:634	Medical Imaging Devices	3	\$50
4800:640	Spine Mechanics	3	\$50
4800:641	Soft Connecting Tissue Biochemistry	3	\$50
4800:642	Hard Connecting Tissue Biochemistry	3	\$50

College of Education

5100:512	Design and Production of Instructional Materials	3	\$25
5100:520	Introduction to Computer-Based Education	3	\$25
5100:630	Seminar in Computer-Based Education	3	\$25
5300:525	Advanced Micro Application in Secondary Schools	3	\$20
5600:645	Tests and Appraisals in Counseling	4	\$15
5600:647	Career Development and Counseling Across the Life-Span	3	\$15
5600:675	Practicum in Counseling I	5	\$15
5600:676	Practicum in Counseling II	2-5	\$15
5600:702	Advanced Counseling Practicum	4	\$15
5600:712	Principles and Practice of Individual Intelligence Testing	4	\$15
5600:714	Objective Personality Evaluation	4	\$15
5610:561	Technology and Materials Application in Special Education	3	\$15
5610:565	Neuromotor Aspects of Physical Disabilities	3	\$10
5610:570	Clinical Practicum in Special Education	3	\$15
5620:610	Educational Diagnosis for School Psychologists	4	\$15
5620:611	Practicum in School Psychology	4	\$15
5700:615	Computer Applications in Educational Administration	2	\$25

College of Business Administration

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

6200:588	CPA Problems: Auditing	2	\$3.50
6200:589	CPA Problems: Theory	2	\$3.50
6200:628	Basic Tax Research	1	\$2
6200:643	Tax Accounting	2	\$3.50
6200:644	Income Taxation of Decedents, Estates and Trusts	2	\$3.50
6200:646	Consolidated Tax Returns	2	\$3.50
6200:648	Tax Practice and Procedure	2	\$3.50
6200:649	State and Local Taxation	2	\$3.50
6200:650	Estate Planning	2	\$3.50
6200:651	United States Taxation and Transnational Operations	2	\$3.50
6200:652	Tax Exempt Organizations	2	\$3.50
6200:653	Business Planning	2	\$3.50
6200:656	Non-Qualified Executive Compensation	2	\$3.50
6700:690	Professional Responsibility	1	\$2
6700:692	International Business	1	\$2
6700:694	Applied Business Documentation and Contact	1	\$2
6700:696	Special Topics in Professional Development	1	\$2

College of Fine and Applied Arts

(All graduate-level courses in 7520: Applied Music are assessed fees in varying amounts.)

7100:591	Architectural Presentations I	3	\$15
7100:592	Architectural Presentations II	3	\$ 5
7400:503	Advanced Food Preparation	3	\$15
7400:518	History of Furniture and Interiors I	3	\$ 7
7400:519	History of Furniture and Interiors II	3	\$ 7
7400:520	Experimental Foods	3	\$15
7400:523	Professional Image Analysis	3	\$10
7400:525	Advanced Textiles	3	\$12
7400:532	Interiors, Textiles, and Product Analysis	3	\$ 5
7400:533	Residential Design	3	\$15
7400:534	Commercial Design	3	\$15
7400:535	Principles and Practices of Interior Design	3	\$10
7400:536	Textile Conservation	3	\$ 5
7400:537	History of Western Costume to 1800	3	\$ 5
7400:538	History of Fashion Since 1780	3	\$ 5
7400:581	Community Nutrition I-Clinical	1	\$40
7400:582	Community Nutrition II-Clinical	1	\$40
7400:588	Practicum in Dietetics	1-3	\$25
7400:603	Family Relationships in Middle and Later Years	3	\$10
7500:553	Music Software Survey and Use	2	\$25
7500:613	Instructional Programming in Music for the Microcomputer	3	\$25
7500:640	Advanced Accompanying I	1	\$37.50
7500:641	Advanced Accompanying II	1	\$37.50
7500:642	Advanced Accompanying III	1	\$37.50
7500:643	Advanced Accompanying IV	1	\$37.50
7600:563	Corporate Video Design	3	\$10
7600:564	Corporate Video Management	3	\$10
7600:566	Audio and Video Editing	3	\$15
7600:567	Directing Video Productions	3	\$15
7600:592	Corporate Video Practicum	2-6	\$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
7800:600	Introduction to Graduate Studies	3	\$ 5
7800:606	Principles of Modern Scenography	3	\$ 5
7900:590	Dance Workshop	1-3	\$ 5
7920:590	Workshop in Dance	1-3	\$ 5

College of Nursing

8200:603	Theoretical Basis for Nursing	3	\$25
8200:605	Computer Applications in Nursing	2	\$25
8200:607	Policy Issues in Nursing	3	\$25
8200:608	Pathophysiological Concepts of Nursing Care	3	\$25
8200:613	Nursing Inquiry I	3	\$25
8200:618	Nursing Inquiry II	4-6	\$25
8200:621	Gerontological Nursing I	3	\$45
8200:625	Gerontological Nursing II	4	\$45
8200:627	Gerontological Nursing III	4	\$45

8200:629	Practicum: Gerontological Nursing	3	\$45
8200:630	Resource Management in Nursing Settings	3	\$25
8200:632	Fiscal Management in Nursing Administration	3	\$25
8200:635	Organizational Behavior in Nursing Settings	3	\$25
8200:638	Practicum: Nursing Administration I	5	\$25
8200:639	Practicum: Nursing Administration II	5	\$25
8200:640	Scientific Components of Nurse Anesthesia	3	\$25
8200:641	Pharmacology for Nurse Anesthesia I	3	\$25
8200:643	Principles of Anesthesia I	4	\$25
8200:644	Pharmacology of Nurse Anesthesia II	3	\$25
8200:645	Principles of Anesthesia II	4	\$25
8200:647	Professional Role Seminar	2	\$25
8200:649	Nurse Anesthesia Residency	0	\$45
8200:651	Child and Adolescent Health Nursing I	3	\$45
8200:655	Child and Adolescent Health Nursing II	3	\$45
8200:656	Pharmacology for Child and Adolescent Health Nursing	3	\$25
8200:657	Child and Adolescent Health Nursing III	4	\$45
8200:659	Practicum: Child and Adolescent Health Nursing	3	\$45
8200:661	Liaison-Community Mental Health Nursing I	3	\$45
8200:665	Liaison-Community Mental Health Nursing II	4	\$45
8200:667	Liaison-Community Mental Health Nursing III	4	\$45
8200:669	Practicum: Liaison-Community Mental Health Nursing	3	\$45
8200:671	Adult Health Nursing I	3	\$45
8200:675	Adult Health Nursing II	4	\$45
8200:677	Adult Health Nursing III	4	\$45
8200:679	Practicum: Adult Health Nursing	3	\$45
8200:682	Nursing Curriculum Development	3	\$25
8200:683	Evaluation in Nursing Education	3	\$25
8200:684	Practicum: The Academic Role of the Nursing Educator	6	\$25
8200:699	Thesis Research	1-6	\$25

Note: Independent Studies, Workshops and Special Topics courses offered on a rotation basis may include fees not listed here. Consult appropriate department for course material and computing fees for those classes.

Regulations Regarding Refunds

All fees, e.g., instructional, general, parking, etc., are subject to change without notice. Students shall be charged fees and/or tuition and other fees in accordance with schedules adopted by the Board of Trustees. 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

Certain fees are subject to refund.

- Instructional fee (tuition) and nonresident surcharge.
- General fee.
- Course materials and computing fee.
- Student parking fee (only if permit is returned).
- Student teaching fee.
- Laboratory breakage and late service deposit.

Amount of Refund

Amount of refund is to be determined in accordance with the following regulations and subject to course instructor/adviser signature requirements contained in the University's official withdrawal policy:

• In full

- if the University cancels the course;
- if the University does not permit the student to enroll or continue in the course;
- if the student dies before or during the term; is drafted into military service by the United States; is called to active duty; or if the student enlists in the National Guard or Reserve prior to the beginning of the term. Notice of induction or orders to active duty is required if the student is called 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 official withdrawal from all credit courses on or before the Sunday (Midnight) which begins the second week of the enrolled term. (Note: If a semester begins other than on a Monday, the maximum refund period will extend to seven (7) days from the beginning of the semester. Example: Semester begins on Tuesday, the maximum refund period will end at midnight on the following Monday.)

- if the student requests official withdrawal after the Sunday (Midnight) which begins the second week of the fall or spring semesters, the following refund percentages apply:

During the second week of the semester	70%
During the third week of the semester	50%
During the fourth week of the semester	30%
During the fifth week of the semester	20%
Thereafter	0%

– if the student requests official withdrawal after the Sunday (Midnight) which begins the second week of the semester of any Summer Session the following refund percentages apply:

During the second week of the summer session	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 of the section (class, institute, or workshop) which have passed compared to the number of days said section has been scheduled to meet.
- Refunds will be determined as of the date of formal withdrawal unless proof is submitted that circumstances beyond control of the student, e.g., hospital confinement, prevented the filing of the formal withdrawal earlier, in which case the refund will be determined as of said circumstance. 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 who is dismissed or suspended for disciplinary reasons.

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.

Academic Dishonesty

Students at The University of Akron are an essential part of the academic community, and enjoy substantial freedom within the framework of the educational objectives of the institution. The freedom necessary for learning in a community so rich in diversity and achieving success toward our educational objectives requires high standards of academic integrity. Academic dishonesty has no place in an institution of advanced learning. The University community is governed by the policies and regulations contained within the *University Rules and Regulations Concerning Campus Conduct and Student Discipline Procedures* available in the Office of Student Discipline, Gardner Student Center 104, (216) 972-7021.

The University of Akron considers academic integrity an essential part of each student's personal and intellectual growth. Instances of academic dishonesty are addressed consistently. All members of the community contribute actively to building a strong reputation of academic excellence and integrity at The University of Akron.

It is each student's responsibility to know what constitutes academic dishonesty and to seek clarification directly from the instructor if necessary. Examples of academic dishonesty include, but are not limited to:

- Submission of an assignment as the student's original work that is entirely or partly the work of another person.
- Failure to appropriately cite references from published or unpublished works or print/non-print materials.
- Unauthorized copying of an assignment in computer programming, or the unauthorized examination or view of the computer, specifically during examinations.
- Possession and/or unauthorized use of tests, notes, books, calculators or formulas stored in calculators not authorized by the instructor during an examination.
- Providing and/or receiving information from another student other than the instructor, by any verbal or written means.
- Observing or assisting another student's work.
- Violation of the procedures prescribed by the professor to protect the integrity of the examination.
- Cooperation with a person involved in academic misconduct.

A student who has been accused of academic dishonesty will be asked to meet with the course instructor. The matter can be resolved informally at the college level and/or an academic sanction can be imposed. If the student opposes the decision, he/she may appeal to the college dean.

A further discussion of these procedures and other avenues for recourse can be found in the *Grievance Procedures for Graduate Students*, available at the Graduate School, The Polsky Building 469, and included in the **Appendix** of this *Bulletin*.

International Students

The University of Akron welcomes international students and seeks to make their educational experience pleasant and meaningful. Each year, approximately 800 international students and scholars from 89 countries pursue studies and research at The University of Akron.

Admission

International students can apply to begin their graduate study for the Fall or Spring semester or for either of the University's two summer sessions. Students should submit their applications at least 5 months in advance of the date they wish to begin their studies. Graduate students applying for assistantships should submit applications 9 months before the term begins for best consideration. The following procedures should be followed:

- Obtain an international student application from the International Admissions Officer, Office of International Programs, The University of Akron, Akron, OH 44325-3106, telephone (216) 972-6349, fax (216) 972-8604. Return the completed application with the one-time nonrefundable application fee of \$50 with the following documentation:
 - An official transcript and degree from all secondary institutions and universities attended previously. Original records in languages other than English must be accompanied by exact English translation and certified by the school, U.S. consulate or other legal certifying authority.
 - Proof of English language proficiency. The University requires each student for whom English is not the native language to take the Test of English as a Foreign Language (TOEFL). This test is administered in major cities throughout the world. Applications may be obtained from binational agencies, United States Information Service (USIS) offices, or from the Educational Testing Service, Princeton, NJ 08540. Graduate applicants must achieve 550 or greater. Exceptions include the departments of English and History (580), Public Administration and Urban Studies (570) and Biomedical Engineering (590).
- While a Provisional Admission may be offered to students who are academically acceptable but who have not yet reached the level of English proficiency required for Full Admission, such students must attend intensive English instruction until they have attained the required level of English proficiency for full-time academic study.
- Proof of adequate financial support. An international student should submit the Declaration and Certification of Finances (DCF) and an original statement from the bank showing availability of sufficient funds to cover the cost of the first year of study, and that these funds will be available to the student in this country.

Costs, Financial Aid, and Medical Insurance

To cover tuition and living expenses for the 1995-96 academic year, international graduate students holding F-1 visas will need approximately \$11,690. Additional costs for J-1 visa holders and student's dependents are indicated on the DCF.

Graduate students may request financial aid through fellowships and graduate assistantships. A graduate student interested in applying for this aid should request the necessary forms when requesting the admission application.

The University of Akron requires that all international students carry medical insurance that meets minimum established requirements. Such health insurance coverage must be in effect during their stay in the United States. International students will not be permitted to register without proof of such coverage.

International Student Orientation

International students are required to attend an International Student Orientation that takes place one week before classes begin and for which they are charged \$45. The orientation dates will be mailed to students with their orientation letter and immigration documents.

Teaching Assistants

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

Note:

International students are encouraged to contact the Office of International Programs directly with questions about housing, climate, insurance, or immigration regulations. Questions concerning degree programs should be directed to the appropriate academic department.



3

Academic requirements

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.

Continuous Enrollment Requirements

There is no formal Graduate School continuous enrollment requirement for the master's degree. Individual master's programs, however, may require continuous enrollment. Students should consult their advisers about this requirement.

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 Credits

Up to one-third of the total credits required for a master's degree may be transferred from an accredited college or university. Departments and colleges may set more restrictive limits. All transfer credit must be at the "A" or "B" level in graduate courses. The credits must be relevant to the student's program as determined by the student's academic department, and must fall within the six-year time limit to complete degree requirements.

Credits transferred may come from a prior degree. Up to one third of credits from a prior or concurrent graduate degree at The University of Akron may be used to satisfy the requirements of a concurrent or subsequent master's degree. A University of Akron student who seeks to enroll in courses elsewhere for transfer credit here must receive prior approval.

A student seeking to transfer credit must have full admission and be in good standing at The University of Akron and at the school at which the credits were earned. 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. Transfer credits from other institutions shall not be computed as part of a student's University of Akron grade point average.

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 member approved to direct doctoral dissertations, the collegiate dean and the dean of the Graduate School.

*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.

Continuous Enrollment Requirement

All students admitted to doctoral programs must register for a minimum of one graduate credit as approved by their advisers during each Fall and Spring semester. Individual departments may exceed this minimum requirement. Doctoral students shall consult their advisers about additional requirements. Master's programs may require continuing enrollment. Students should consult their advisers about this requirement.

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.

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; 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 400-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 credits above the baccalaureate required in a doctoral program may be transferred from accredited colleges or universities. Departments and colleges may set more restrictive limits. The credits must be relevant to the student's academic program as determined by the student's academic department and must fall within the 10-year limited to complete degree requirements if beyond the master's degree. All credits transferred must be at the "A" or "B" level in graduate courses.

Credits transferred may come from a prior degree. No more than thirty semester credits may be transferred from a single master's degree. Credits earned in prior or concurrent programs at The University of Akron shall be treated in the same manner as credits earned elsewhere. A University of Akron student who seeks to enroll in courses elsewhere for transfer credit here must receive prior approval.

A student seeking transfer credit must have full admission and be in good standing at The University of Akron and at the school at which the credits were earned. 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. Transfer credits from other institutions shall not be computed as part of a student's University of Akron grade point average.

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 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, 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.



4

Graduate
studies

Buchtel College of Arts and Sciences

Randall C. Moore, Ph.D., *Dean*

Roger B. Creel, Ph.D., *Associate Dean*

William A. Francis, Ph.D., *Associate Dean*

Nancy K. Grant, 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. This consists of the 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 Department 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.

	<i>Credits</i>
– 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 1750, modern Europe since 1750, 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 be examined in a fourth field as well, 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 adviser, 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.

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) or 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 *Doctoral Dissertation*; (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 the 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 student 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 coursework or equivalent (18 credits) in the sociology master of arts program at The University of Akron. The coursework must include the master of arts core sequence. Scores from 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 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 in coursework.
- 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.
- Full 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 coursework.
- 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) coursework beyond the bachelor's degree.

Doctor of Philosophy in Urban Studies

The Department of Public Administration and Urban Studies of The University of Akron offers a program leading to the Ph.D. in Urban Studies (joint with Cleveland State University). 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 for university and professional appointments.

Admission

Admission to the Ph.D. Program involves faculty consideration of all of the following criteria which, taken together, present evidence of the likelihood of success in advanced study:

- Grade point average from previous Master's Degree Program. Students will normally not be admitted with a GPA below 3.5. Having a 3.5 GPA, however, is not sufficient, in itself, for admission.
- Graduate Record Examination General Test Scores. The applicant is expected to submit a score on both the verbal and quantitative portions of the GRE.
- Three letters of recommendation from persons familiar with the applicant's recent performance and abilities.
- A sample of the student's written work. Generally, this should be a thesis or final project paper from the Master's Program. Students who did not have such a requirement in the Master's Program are free to submit several samples of written work – for example, term papers, professional reports, published articles.
- A personal statement from the applicant detailing area of intended specialization and career aspirations (form available in application packet). A student will be considered for admission only if faculty resources are available in the student's indicated area of specialization.

- Those whose native tongue is not English must also demonstrate proficiency in the English Language by scoring a minimum of 570 on the Test of English as Foreign Language (TOEFL) and submitting an acceptable score from the Test of Written English (TWE) and a minimum score of 220 on the Test of Spoken English (TSE).

A student may be required to appear before the Doctoral Committee before a decision is made on admission to the Program.

Entering students will also have successfully completed the following Master's level social science prerequisites (or equivalents) before formal admission:

3980:600	Basic Analytical Research	3
3980:601	Advanced Research and Statistical Methods	3
3980:611	Introduction to the Profession of Public Administration	3
	or	
3350:630	Introduction to Planning Theory	3
3980:640	Fiscal Analysis	3
3980:643	Introduction to Public Policy	3

The Doctoral Committee may also require an applicant to take an admission examination, either written or oral, or both. A student may be admitted to the doctoral program subject to completing graduate-level bridge-up coursework designed to make up deficiencies in previous coursework. Bridge-up coursework will not count toward the doctoral degree course requirements.

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 (eight courses); and a minor consisting of 12 credits (four 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, 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 to work in close cooperation with an individual faculty member to pursue research interests 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, 48 hours of coursework, and 15 hours of dissertation.

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

Admission 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.
- Non-active speakers of English must submit a TSE score of 220 or above.

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.

Nonthesis 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 coursework (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 coursework – 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 coursework including a thesis equivalent to six credits is required. At least 21 credits must be at the 600 level in economics. Thesis must be written in an area of specialization in which the individual has at least two courses.

Nonthesis Option

A minimum of 30 credits of coursework is required. At least 21 credits must be at the 600 level in economics. The individual must also specialize in an area.

Required Courses for both options:

3250:602	Macroeconomic Analysis I	3
3259:611	Microeconomic Theory I	3
3250:620	Applications of Mathematical Models to Economics*	3
3250:626	Statistics for Econometrics*	3

Areas of Specialization:

Economic Development and Planning
Economic Theory and Policy
Industrial Organization and Public Policy
International Economics
Labor and Industrial Relations
Quantitative Methods

Exceptional departures from these requirements may be approved with the permission of the graduate faculty and department head. Courses taken outside the department must be approved (in writing) by the student's adviser prior to enrollment.

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

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).

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

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.

Nonthesis 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 literature 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
3300:674	Research Methodologies in Composition	3

Other Available Courses for Both Options

Composition and Rhetoric:

3300:575	Theory of Rhetoric	2
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	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 Studies. 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 requirements.

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

Geography and Planning

Master of Arts in Geography

Nonthesis Option

• A minimum of 39 graduate credit hours, to include no more than 6 credits of 3350:698. At least 12 credit hours must be taken at the 600 level, excluding 3350:698 and 699.

• Core Requirements – 12 credit hours (4 courses)

3350:581	Geographic Research Methods
3350:583	Spatial Analysis
3350:596	Field Research Methods
3350:687	History of Geographic Thought

• Seminars: Completion of research papers in at least 2 courses from the following (6 hours):

3350:600	SEM: (tag)
3350:601	SEM: (tag)
3350:602	SEM: (tag)

• Electives – 21 credit hours

Any course taken outside the department must be approved in advance by the student's Graduate Adviser or the Department Head.

Thesis Option

• A minimum of 36 graduate credit hours, to include no more than 6 credits of 3350:698. At least 12 credit hours must be taken at the 600 level, excluding 3350:698 and 699.

• Core Requirements (12 credit hours)

3350:581	Geographic Research Methods
3350:583	Spatial Analysis
3350:596	Field Research Methods
3350:687	History of Geographic Research

• Thesis – 9 credit hours

• Electives – 15 credit hours, at least 3 credits of which must be from the following:

3350:600	SEM: (tag)
3350:601	SEM: (tag)
3350:602	SEM: (tag)

Any course taken outside the Department must be approved in advance by the student's Graduate Adviser or the Department Head.

Master of Science in Geography

• Minimum of 39 graduate credit hours, to include no more than 6 credits of 3350:698. At least 12 credit hours must be taken at the 600 level, excluding 3350:698 and 699.

• Core Required Courses – 15 credit hours

3350:581	Geographic Research Methods
3350:583	Spatial Analysis
3350:596	Field Research Methods
3350:687	History of Geographic Thought
3350:680	Advanced Spatial Analysis

• Methods/Techniques Requirement

At least 4 courses (12 credit hours) from:

3350:505	Geographic Information Systems
3350:548	Automated Computer Mapping
3350:542	Thematic Cartography
3350:547	Introduction to Remote Sensing
3350:589	ST: Computer Applications
3350:600	SEM: Spatial Analysis
3350:637	Methods of Planning Analysis I

• Electives – 12 credit hours

Any course taken outside the department must be approved in advance by the student's Graduate Advisor or the Department Head.

Master of Arts (Geography/Urban Planning)

• A total of 45 credits of coursework plus internship (3350:685) as follows:

• Core Requirements

3350:533	Introduction to Planning
3350:581	Geographic Research Methods
3350:583	Spatial Analysis
3350:536	Urban Land Use Analysis
3350:630	Introduction to Planning Theory
3350:631	Facilities Planning
3350:632	Land Use Planning Law
3350:637	Methods of Planning Analysis I
3350:638	Methods of Planning Analysis II
3350:639	Development of American Planning

• Electives – 5 courses, with a concentration from one of the following groups.

Land Use and Transportation (any three)

3350:522	Transportation Systems Planning
3350:528	Industrial and Commercial Site Location
3350:595	Soil and Water Field Studies
3350:680	Advanced Spatial Analysis

Cartography/Remote Sensing (any three)

3350:542	Thematic Cartography
3350:544	Map Complication and Reproduction
3350:548	Automated Computer Mapping
3350:547	Introduction to Remote Sensing
3350:549	Advance Remote Sensing

Comparative Planning (any three)

3350:538	World Metropolitan Areas
3350:550	Development Planning
3350:571	Medical Geography and Health Planning
3350:633	Comparative Planning
3350:680	Advanced Spatial Analysis

G.I.S. (any three)

3350:505	Geographic Information Systems
3350:547	Introduction to Remote Sensing
3350:542	Thematic Cartography
3350:548	Automated Computer Mapping
3350:680	Advanced Spatial Analysis

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 any 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	Master's Thesis	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. A committee of engineering geology faculty will determine appropriate coursework on an individual basis.

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	Statistics	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**

- Students applying for admission to the M.A. program must have a minimum undergraduate grade-point average of 3.0. The applicant's average in history courses should be substantially higher. Applicants must also have completed at least 24 semester or 36 quarter hours in history courses at the undergraduate level. An application to the M.A. program consists of the following:
 - an application form;
 - a letter of intent, stating the applicant's reasons for wishing to pursue graduate work and the fields of history which the applicant intends to study;
 - scores on the Graduate Record Examination, General Aptitude Test;
 - a writing sample, preferably a research paper from a history class;
 - three letters of recommendation, preferably from faculty who know the applicant well.
- Applicants whose native language is not English must also score at least 580 on the Test of English as a Written Language (TOEFL), at least 240 on the Test of English as a Spoken Language (TSE), and take the Test of Written English (TWE).
- Degree requirements include:
 - Satisfactory completion of a minimum of 30 credits of graduate study in history, of which only six may be in individual reading.
 - Concentrated study of three fields, two of which must be chosen from the following:

Ancient	America to 1877
Medieval	United States Since 1877
Europe, Renaissance to 1750	Latin America
Europe, 1750 to the Present	East Asia
England and the Empire	History of Science

 The third field must be chosen from the above history fields or from an approved cognate discipline.
 - The student must pass written examinations in two of the three fields. The third field requirement will be met by at least seven credits of coursework at the graduate level, completed with a GPA of 3.0.

– 3400:689 Historiography

– Twenty-three hours of 600-level coursework, at least 16 credits of which must be in seminars. Seminars must be chosen to satisfy one of the following options.

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	Seminar in Mathematics	1-3

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 *Master's Thesis* 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.

Nonthesis 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 pre-requisites:

3470:561 *Applied Statistics I*, four credits; or equivalent.

3470:515 *Math Concept for Statistics*, four credits, or 3450:521/522 *Advanced Calculus I/II*, three credits each, or equivalent.

- 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
3470:692	Seminar in Statistics	1-3

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 *Master's Thesis* must be completed.

Nonthesis 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 nonthesis option.
- With the consent of the department, up to 6 credits of approved graduate-level electives outside the department may be substituted in the thesis or nonthesis 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	Seminar in Mathematics	1-3

Thesis Option (30-39 credits)

In addition to the placement review and core requirements, 3-5 credits of approved 500/600 level courses in mathematics (3450), statistics (3460), or computer science (3460), and 2-4 credits in 3450:699 *Master's Thesis* 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.

Nonthesis Option (33-42 credits)

In addition to the placement review and core requirements, 10 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
3470:650	Advanced Probability and Stochastic Process	3
3470:651	Probability and Statistics	4
3450:692	Seminar in Mathematics	1-3

Thesis Option (30-39 credits)

In addition to the placement review and core requirements, 2-4 credits of approved 500/600-level courses in mathematics (3450), statistics (3460) or computer science (3460), and 2-4 credits in 3450:699 *Master's Thesis* 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.

Nonthesis Option (33-42 credits)

In addition to the placement review and core requirements, 9 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.

Master of Science – Computer Science

Admission Requirements

All applicants for admission to the graduate program in computer science must meet the university requirements for graduate admission as published in Section 3 of the *Graduate Bulletin*. In addition to these requirements, the applicant must also:

- submit 3 letters of recommendation from individuals capable of evaluating the applicant's potential for success in the program;
- have earned a baccalaureate degree in computer science or a related discipline from an accredited college or university with a GPA of 3.00 or higher in computer science and related courses;
- demonstrate proficiency in the areas of differential and integral calculus, probability and statistics, discrete mathematics, and knowledge of at least one high-level, general purpose programming language; and,
- demonstrate proficiency in the areas of data structures, assembly language, computer organization, operating systems, and the theory of programming languages. A student deficient in one or more of these areas may be granted conditional admission.

The Graduate Record Examination (Aptitude and Advanced Computer Science Tests) is recommended.

Degree Requirements

The curriculum has been designed to follow the guidelines and recommendations of the Association for Computing Machinery for Master's Programs in Computer Science. Most full-time degree candidates admitted into the program will complete the degree requirements in two years. The thesis option requires 30 semester hours of graduate work while the nonthesis option requires 33.

- Core Courses (required of all students):

Seven courses must be chosen from the following categories: two from each of categories A and B, and one from each of categories C, D, and E.

- A. Programming Languages
- B. Operating Systems and Computer Architecture
- C. Theoretical Computer Science
- D. Data and File Structures
- E. Applications

- Complete at least one 2-course sequence from each of the following groups:
Group 1: (526, 626), (540, 640), (565, 665)
Group 2: (555, 655), (560, 660), (570, 670), (575, 675)
- 3460:692 *Seminar in Computer Science*. This seminar is an introduction to research in computer science. For thesis option students, it is the beginning of the thesis research.
- At least 20 credits must be taken at the 600 level.

- With prior consent, up to 3 credits of approved graduate-level work outside the department may be substituted for elective courses in both the thesis and non-thesis options.
- A written comprehensive examination, taking the form suggested by the department, must be completed in the thesis or non-thesis option. The examination will cover four areas of computer science chosen by the student and the student's advisor. Two of the areas will be based on the two-course sequences (listed in Option II) above.

Thesis Option (30 credits of graduate work)

In addition to the core curriculum, 3-5 credits in approved 500/600-level departmental courses and 2-4 credits in 3460:699 *Master's Thesis* must be completed.

Non-thesis Option (33 credits of graduate work)

In addition to the core curriculum, 9-10 credits in approved 500/600-level departmental courses must be completed.

Coordinated Program

Coordinated Engineering Applied Mathematics program for the Doctor of Philosophy in Engineering degree between the College of Engineering and the Department of Mathematical Sciences

The faculty in the College of Engineering and the Department of Mathematical Sciences have agreed to provide a coordinated program, subject to the following conditions, for those graduate students who elect the interdisciplinary field of Engineering Applied Mathematics.

Admission Requirements

Applicants for the Engineering Applied Mathematics Program must have their graduate application and credentials evaluated by one of the departments in the College of Engineering and the Department of Mathematical Sciences. The Admission Requirements for the Doctor of Philosophy in Engineering, as given in the *Graduate Bulletin* (see page 29, College of Engineering), shall apply to all applicants for the Engineering Applied Mathematics Program.

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 complete at least one of the following three options:

Option A: A written exam covering the field of physics at the advanced graduate level.

Option B: A formal report, based on 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* 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 **nonthesis 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: Master 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;

– Nonthesis 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.

Nonthesis 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.

Public Administration and Urban Studies

Master of Arts in Urban Studies

Courses may be taken outside the Department of Public Administration and 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 in consultation with a faculty adviser, plan a complete course of study which includes 15-18 hours of core and 15-18 hours of approved electives.

• Core:

3980:600	Basic Quantitative Research	3
3980:601	Advanced Research and Statistical Methods	3
3980:602	History of Urban Development	3
3980:641	Urban Economic Growth and Development	3
3980:643	Introduction to Public Policy	3
3980:699	Master's Thesis (optional)	4

Basic Program

Complete 33 credits of coursework as follows:

- Core – 15-18 credits.
- Approved electives – 15-18 credits.
- 3 credits of approved electives may be substituted for thesis with approval of academic adviser.

Master of Public Administration (MPA)

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	45 credits
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- Core requirements (36-39 credits):

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
3980:695***	Internship (may be repeated for a total of 6 credits)	3
3980:699	Master's Thesis (optional)	3

- and select 1 from the following 3 courses:

3980:602	History of Urban Development	3
3980:617	Leadership and Decision Making	3
3980:671	Program Evaluation	3

*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.

**Student may take either 3980:674 or 3980:673 in lieu of 3980:601. Students may also take either 3980:617 or 3980:630 in lieu of 3980:643.

***Student working full-time may satisfy Internship without a field placement. See advisor for alternative requirement.

Any required course except 3980:699, *Master's Thesis*, may be waived on the basis of proficiency in the area covered by the course. The criteria for waiver considered by the department are:

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

- Areas of Concentration:

Public and Non-Profit Management
Urban Theory and Administration
Public Sector Economics and Financial Management
Public Policy Analysis and Program Evaluation

- See advisor for suggested courses. Students are encouraged to construct a coherent set of courses that will contribute to more in-depth or multi-disciplinary knowledge of a given area of concentration.

- Advanced Elective Courses (6-9 credits):

3250:639	Public Employee Collective Bargaining	3
3250:666	Seminar in Regional Economic Analysis and Development	3
3700:630	Seminar in National Politics	3
3700:641	Seminar in Intergovernmental Relations	3
3700:670	Seminar in the Administrative Process	3
3980:590	Workshop	1-3
3980:612	National Urban Policy	3
3980:613	Intergovernmental Management	3
3980:618	Citizen Participation	3
3980:620	Social Service Planning	3
3980:621	Urban Society and Service Systems	3
3980:622	Health Planning and Public Policy	3
3980:623	Public Works Administration	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
3980:672	Alternate Urban Futures	3
3980:673	Computer Applications for Public Organizations	3
3980:674	Analytical Techniques for Public Administration	3
3980:680	Selected Topics in Urban Studies	3
3980:681	Selected Topics in Urban Studies	3
3980:697	Individual Studies	1-3

J.D./Master of Public Administration

The University offers a joint J.D. and Public Administration program. The title is 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 Public Administration and Urban Studies.

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 an internship of three credits. (Internship is required of any student without professional administrative experience.)

This program reduces the total existing credit hours of the School of Law and Public Administration by nine credit hours (from 85 to 76), while public administration requirements are reduced by 12 credit hours (from 42 to 30).

Sociology

Master of Arts

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.

Nonthesis 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 an essay, and pass an oral exam on the essay.

College of Engineering

Irving F. Miller, Ph.D., *Dean*

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

Paul C. Lam, Ph.D., *Associate Dean,
Undergraduate Studies and Minority Affairs*

Dorie McCubbrey, Ph.D., *Director of Women in Engineering
Program*

DOCTOR OF PHILOSOPHY IN ENGINEERING DEGREE

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

Admission Requirements

Applicants 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 the College of Engineering.

Applicants with a master of science degree must provide satisfactory evidence of an equivalent engineering baccalaureate background to the Dean of the College of Engineering.

Applicants 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.

Applicants with a bachelor's degree must have a cumulative grade-point average of at least 3.0/4.0.

Applicants with a master's degree must have a cumulative graduate grade point average of at least 3.5/4.0.

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.

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

Applicants with a bachelor's degree or a master's degree in a discipline other than engineering shall have completed undergraduate coursework in calculus, differential equations, have one year of classical physics, and must select and complete at least 24 credits of undergraduate coursework of which 18 credits must be from one of the four undergraduate engineering disciplines listed below. The remaining 6 credits may be from among the four disciplines listed below. These undergraduate engineering courses may be taken prior to graduate admission, or concurrently if the student has Full Admission or Provisional Admission, and is enrolled for at least 9 graduate credits.

Chemical Engineering

4200:325	Equilibrium Thermodynamics	4
4200:321	Transport Phenomena I	3
4200:322	Transport Phenomena II	3
4200:330	Chemical Reaction Engineering	3
4200:351	Fluid and Thermal Operations	3
4200:353	Mass Transfer Operations	3
4200:435	Process Analysis and Control	3
4200:441	Process Economics and Design	4
	Total	26

Civil Engineering

4300:306	Theory of Structures	3
4300:313	Soil Mechanics	3
4600:310	Fluid Mechanics	3
4300:323	Water Supply and Wastewater Disposal	4
4300:341	Hydraulic Engineering	3
4300:361	Transportation Engineering	3
4300:401	Steel Design	3
4300:403	Reinforced Concrete Design	3
	Total	25

Electrical Engineering

4400:360	Physical Electronics	3
4400:361	Electronic Design	4
4400:363	Switching and Logic	4
4400:334	Energy Conversion I	3
4400:335	Energy Conversion Lab	2

4400:445	Analog Communications	3
4400:553	Antenna Theory	3
4400:572	Control Systems II	4
	Total	26

Mechanical Engineering

4600:300	Thermodynamics I	4
4600:301	Thermodynamics II	3
4600:310	Fluid Mechanics	3
4600:315	Heat Transfer	3
4600:336	Analysis of Mechanical Components	3
4600:340	Systems Dynamics and Response	3
4600:330	Mechanical Metallurgy	2
4600:531	Fundamentals of Mechanical Vibrations	3
4600:541	Control System Design	3
	Total	27

Degree Requirements

The University's Academic Requirements (See **Academic Requirements** in this *Graduate Bulletin*) for the Doctoral Degree and the following College of Engineering's academic requirements for the Doctoral Degree must be satisfied.

- 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 study, a dissertation director, and an Interdisciplinary Doctoral Committee before completion of 18 credits of coursework.
- 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 coursework, of which 42 credits must be at the 600 and 700 level and of which 6 credits may be special topics or 400/500 level courses. 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 successfully (no "fail" votes) defend the dissertation to the Interdisciplinary Doctoral Committee.

A copy of the Ph.D. in Engineering Program Procedures may be obtained from the office of the Dean of the College of Engineering.

Interdisciplinary Fields of Study

The proposal to establish a doctoral program in the College of Engineering, which was approved by the Board of Trustees of The University of Akron and the Ohio Board of Regents in 1967-68, defines the four undergraduate departments, Chemical, Civil, Electrical, and Mechanical, as the basic disciplines for the interdisciplinary programs in Environmental Engineering, Materials Science, Mechanics, Systems Engineering, and Transport Processes. The proposal's intent is to limit the administrative mechanism to the College and the departments while the interdisciplinary programs could be expanded to adapt to the changing research or funding trends. Since the approval of the proposal, Biomedical Engineering and Polymer Engineering have been added to the list of interdisciplinary programs. These interdisciplinary programs are broadly defined as follows.

Environmental Engineering includes the study of water and air pollution, environmental health, chemical disposal, waste management, noise control, resource engineering, and appropriate fields of urban planning.

Mechanics includes the theoretical and experimental study of the stresses, strains, and endurance of structures, machines and various materials, mechanics of solids, fluids, solid, and composite materials.

Systems Engineering include the scientific prediction, control, and evaluation of the performance of integrated operational systems, and interaction effects among the components of engineering systems. It includes system analysis and design, operations research, linear and dynamic programming.

Materials Science studies the materials from the physical, chemical, and engineering standpoints. Its purpose is to develop a better understanding of the composition, properties, and performance of various materials, and to develop new materials, manufacturing methods, and applications.

Transport Processes include the theoretical and experimental study of the transfer of mass, energy, and power, as related to engineering systems and processes.

Biomedical Engineering studies the theoretical and experimental application of engineering principles to biomedical problems. Some typical areas of interest are signal and image processing, biomechanics, and biomaterials.

Polymer Engineering combines fundamental engineering principles with the structure and rheological properties of polymers to design and analyze polymer processes and equipment.

The interdisciplinary doctoral program permits doctoral student access to the academic resources of the entire College and provides a sound economic base for a program that must deal with doctoral student populations that are much smaller than those for undergraduate or master degrees.

COORDINATED AND JOINT PROGRAMS

Coordinated Engineering Applied Mathematics program for the Doctor of Philosophy in Engineering degree between the College of Engineering and the Department of Mathematical Sciences

The faculty in the College of Engineering and the Department of Mathematical Sciences have agreed to provide a coordinated program, subject to the following conditions, for those graduate students who elect the interdisciplinary field of Engineering Applied Mathematics.

Admission Requirements

Applicants for the Engineering Applied Mathematics Program must have their graduate application and credentials evaluated by one of the departments in the College of Engineering and the Department of Mathematical Sciences. The Admission Requirements for the Doctor of Philosophy in Engineering, as given in the *Graduate Bulletin*, shall apply to all applicants for the Engineering Applied Mathematics Program.

Degree Requirements

The applicable Degree Requirements for the Engineering Applied Mathematics Program are those given in the *Graduate Bulletin* under the section Doctor of Philosophy in Engineering. These degree requirements include passing a Qualifying Examination, identifying a Dissertation Director, establishing an Interdisciplinary Doctoral Committee, completing a formal Plan of Study, satisfying the University's language and residency requirement, passing a Candidacy Examination, presenting an acceptable Dissertation Proposal, writing a dissertation, and publicly and successfully (no "fail" votes) defending the dissertation before the Interdisciplinary Doctoral Committee.

Students in the Engineering Applied Mathematics Program must pass a departmental Qualifying Examination composed and administered by the participating faculty from the Department of Mathematical Sciences and the participating faculty from one of the four undergraduate departments in the College of Engineering.

The Interdisciplinary Doctoral Committee shall consist of at least six members. It shall have an equal number of faculty with primary appointments in the College of Engineering and participating program faculty from the Department of Mathematical Sciences. The participating faculty from the Department of Mathematical Sciences must hold joint appointments in the College of Engineering.

Students lacking a bachelor's degree or master of science degree in engineering shall take a minimum of 24 credits of bridging courses of which 6 credits may be at the 500 level. (For a list of these bridging courses, see the Admission Requirements for the Doctor of Philosophy in Engineering degree.) Students with a bachelor's degree in engineering shall take:

3450:312	Linear Algebra	3
3450:427	Introduction to Numerical Analysis	3
3450:438	Advanced Engineering Mathematics I	3
3450:439	Advanced Engineering Mathematics II	3
3450:421	Advanced Calculus I	3
3450:422	Advanced Calculus II	3
	Total	18

The student may substitute 3450:601, *Introduction to Analysis*, for Advanced Calculus I and Advanced Calculus II. These bridging courses may be taken concurrently with graduate courses in the Engineering Applied Mathematics Program and they must be completed in the first two academic years of study.

Graduate students who elect the Engineering Applied Mathematics Program may proceed directly from their baccalaureate degree to the doctoral degree.

Students participating in the Engineering Applied Mathematics Program must have 42 credit hours of 600/700 level courses, of which none are special topics courses, and 6 credits of special topics or 400/500 level courses. At least 24 credit hours of coursework must be from the College of Engineering and at least 24 credits of coursework must be from the Department of Mathematical Sciences.

Coordinated program for the Doctor of Philosophy in Engineering degree between The University of Akron and Youngstown State University.

The University of Akron and Youngstown State University are engaged in a coordinated program with the objective of facilitating graduate study by engineering students residing in proximity to Youngstown State University. This provides the opportunity and convenience of completing some of the requirements for the Doctor of Philosophy in Engineering at The University of Akron through joint counseling and enrollment at Youngstown State University.

Admission Requirements

When an engineering graduate student at Youngstown State University declares an interest in the joint doctoral program, the student shall prepare a letter of intent, with academic credentials, to the dean of engineering at Youngstown State University. The dean of engineering at Youngstown State University shall forward the letter of intent and academic credentials, together with a recommendation, to the dean of engineering at The University of Akron. The dean of engineering at The University of Akron shall have the graduate faculty in the applicant's discipline evaluate the academic credentials and make a recommendation on the academic acceptability of the applicant. If the recommendation is favorable, the student shall be advised to apply to the Graduate School at The University of Akron for formal admission to the Doctoral Program in the College of Engineering at The University of Akron. The dean of Graduate Studies and Research at Youngstown State University shall be kept informed of the progress of the admission procedure. The applicant from Youngstown State University must satisfy the Admission Requirements for the Doctor of Philosophy in Engineering at The University of Akron.

Degree Requirements

The engineering student from Youngstown State University must satisfy the Degree Requirements for the Doctor of Philosophy in Engineering at The University of Akron subject to the following modifications.

One of the members of the Interdisciplinary Doctoral Committee for the joint doctoral program candidate shall be an engineering faculty member from Youngstown State University and normally would be the student's dissertation director, although this is not necessary. The faculty member from Youngstown State University shall have adjunct status at The University of Akron and qualify for Category II graduate faculty membership.

One-half (24 credits) of the coursework and one-half (24 credits) of the research credits may be taken at Youngstown State University. The parity of courses is decided by the faculty on the Interdisciplinary Doctoral Committee when the student submits a proposed Plan of Study. At the Advancement to Candidacy, the Committee recommends official transfer of credits from Youngstown State University to The University of Akron.

Joint program for the M.D. and Doctor of Philosophy in Engineering degree between the College of Engineering at The University of Akron and the Northeastern Ohio Universities College of Medicine.

The College of Engineering and NEOUCOM provide a coordinated program for those desiring both the M.D. and Doctor of Philosophy in Engineering degrees. This program integrates the knowledge and skills acquired by the student in each of the 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.

Admission Requirements

Applicants with a bachelor's or master's degree in a discipline other than engineering or in engineering will be required to meet the Admission Requirements for the Doctor of Philosophy Degree in Engineering. Applicants will be required to have completed the following courses and to have taken the MCAT prior to admission into the coordinated M.D. and Doctor of Philosophy in Engineering program:

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

Degree Requirements

To obtain an M.D. degree from NEOUCOM and a Doctor of Philosophy Degree in Engineering, the student must satisfy NEOUCOM's degree requirements and the College of Engineering's Doctor of Philosophy in Engineering Degree Requirements. This coordinated program does not change in any way the degree requirements for either program.

MASTER OF SCIENCE DEGREES

The degrees of 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.

Admission Requirements

Applicants for any of these master of science programs 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 evidence of an equivalent academic background to the Dean of the College of Engineering and the appropriate department head.

Applicants must submit an official undergraduate transcript, undergraduate grade point average, at least two letters of recommendation, and official results of the verbal, quantitative, and analytical portions of the GRE.

Applicants with a bachelor's degree must have an overall grade-point average of 2.75 or better or 3.00 for the last two years (64 semester credits or equivalent).

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).

Applicants who do not satisfy the requirements for Full Admission may be granted Provisional Admission or Deferred Admission.

Applicants with a bachelor's degree in a discipline other than engineering shall have completed coursework in calculus, differential equations, have one year of classical physics, and must select and complete at least 24 credits of undergraduate coursework of which 18 credits must be from one of the four undergraduate disciplines listed below. These undergraduate engineering courses may be taken prior to graduate admission, or concurrently if the student has Full Admission or Provisional Admission, and is enrolled for at least 9 graduate credits.

Chemical Engineering

4200:325	Equilibrium Thermodynamics	4
4200:321	Transport Phenomena I	3
4200:322	Transport Phenomena II	3
4200:330	Chemical Reaction Engineering	3
4200:351	Fluid and Thermal Operations	3
4200:353	Mass Transfer Operations	3
4200:435	Process Analysis and Control	3
4200:441	Process Economics and Design	4
	Total	26

Civil Engineering

4300:306	Theory of Structures	3
4300:313	Soil Mechanics	3
4600:310	Fluid Mechanics	3
4300:323	Water Supply and Wastewater Disposal	4
4300:341	Hydraulics	3
4300:361	Transportation Engineering	3
4300:401	Steel Design	3
4300:403	Reinforced Concrete Design	3
	Total	25

Electrical Engineering

4400:360	Physical Electronics	3
4400:361	Electronic Design	4
4400:363	Switching and Logic	4
4400:384	Energy Conversion I	3
4400:385	Energy Conversion Lab	2
4400:445	Analog Communications	3
4400:453	Antenna Theory	3
4400:472	Control Systems II	4
	Total	26

Mechanical Engineering

4600:300	Thermodynamics I	4
4600:301	Thermodynamics II	3
4600:310	Fluid Mechanics	3
4600:315	Heat Transfer	3
4600:336	Analysis of Mechanical Components	3
4600:340	Systems Dynamics and Response	3
4600:380	Mechanical Metallurgy	2
4600:444	Fundamentals of Mechanical Vibrations	3
4600:441	Control System Design	3
	Total	27

Degree Requirements

The University's Academic Requirements (See Academic Requirements in this Graduate Bulletin), the following College of Engineering's and department's academic requirements must be satisfied for the master of science degrees in the College of Engineering.

- Identify a three-member Advisory Committee including a major adviser before completion of 9 credit hours of coursework.
- Complete a formal Plan of Study that is acceptable to the Advisory Committee with a minimum of 24 credit hours of coursework of which no more than 6 credits are special topics courses. The formal Plan of Study may be revised upon approval of the Advisory Committee.
- Successfully (no "fail" votes) defend the thesis before the Advisory Committee, or have the Engineering Report approved by the Advisory Committee, or successfully complete the appropriate department's nonthesis option requirements.

Master of Science in Chemical Engineering

Thesis Option

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
	Master's Thesis	6
	Total	30

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
	Total	36

Chemical engineering students in both degree options must pass a comprehensive examination and are expected to attend and to participate in the department's seminars.

Master of Science in Civil Engineering

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

Thesis Option

	Civil Engineering Courses	15
	Approved Mathematics or Science	3
	Approved Electives	6
	Master's Thesis	6
	Total	30

Nonthesis Option

	Civil Engineering Courses	15
	Approved Mathematics or Sciences	3
	Approved Electives	12
	Engineering Report	2
	Total	32

Master of Science in Electrical Engineering

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

Thesis Option

	Electrical Engineering Courses**	15
	Approved Mathematics	6
	Approved Electives	3
	Master's Thesis	6
	Total	30

Nonthesis Option

	Electrical Engineering Courses**	18
	Approved Mathematics	6
	Approved Electives	9
	Total	33

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

**The required electrical engineering coursework of 18 credits may not include more than six credits of 500-level courses.

Electrical engineering students pursuing the Nonthesis option must pass a graduate level oral comprehensive examination which may be taken after 24 credits have been completed.

Master of Science in Mechanical Engineering

Main areas of graduate study in mechanical engineering include systems and controls, engineering mechanics, and thermal-fluid sciences. Students in the department are encouraged to take at least one mechanical engineering course outside the main area of interest to develop some breadth in their graduate education.

Thesis Option

Mechanical Engineering Courses*	15
Approved Mathematics	3
Approved Electives	6
Master's Thesis	6
Total	30

Nonthesis Option

Mechanical Engineering Courses*	15
Approved Mathematics	3
Approved Electives	12
Engineering Report	2
Total	32

Master of Science in Engineering

This program is intended for the student whose educational objectives cannot be met by the four departmental master of science programs or those who wish to specialize in biomedical engineering, polymer engineering, or engineering management. Except for students in biomedical engineering and polymer engineering, students should declare in writing to the Dean of Engineering of their intention to study toward the Master of Science in Engineering degree. Upon admission, the dean will appoint an advisory committee consisting of three faculty members who are selected from at least two different departments. The thesis must be successfully (no "fail" votes) defended before the Advisory Committee, or the engineering report must receive the approval of the Advisory Committee.

Thesis Option

Engineering Courses	12
Approved Mathematics or Science	3
Approved Electives	9
Master's Thesis	6
Total	30

Nonthesis Option

Engineering Courses	18
Approved Mathematics or Science	3
Approved Electives	9
Engineering Report	2
Total	32

Biomedical Engineering Specialization

4800:601	Biomedical Instrumentation	4
4800:611	Biometry	3
3100:695	Physiology for Engineers and Lab	5
	Approved Electives	15
	Master's Thesis	6
	Total	33

Polymer Engineering Specialization**

Polymer Engineering Core	12
Polymer Engineering Electives	11
Approved Engineering and Science Elective	3
Thesis	6
Total	32

Engineering Management Specialization

This is an evening program which is intended primarily for practicing engineers who are working full-time and wish to upgrade their engineering and management skills. The Engineering Management Report must be approved by the Advisory Committee, of which one member shall be from the College of Business Administration.

Engineering Courses	21
Management Courses	15
Engineering Management Report	2
Total	38

Required Courses

6200:601	Financial Accounting*
6400:602	Managerial Finance**
6500:600	Management and Organizational Behavior*
6600:600	Marketing Concepts*

Elective

Choose three credits of 600 level College Administration courses.

*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 coursework.

**The specific courses for the Polymer Engineering Core Courses, Polymer Engineering electives, and Approved Engineering and Science Courses are listed under the College of Polymer Science and Polymer Engineering.

College of Education

William E. Klingele, Ed.D., *Dean*
 Larry G. Bradley, Ph.D., *Associate Dean*
 Robert K. Eley, Ed.D., *Director of Student Services*

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 a 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 Philosophy degree.

*More advanced graduate business courses shall be required of students who have completed similar undergraduate courses. This determination shall be made by the Assistant Dean and Director of Graduate Business Programs, College of Business Administration.

**6200.601 is a prerequisite for 6400.602.

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 1,700 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 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
5600:899	Doctoral Dissertation (minimum)	15
	Internship	NC

Counseling and Special Education Track requirements:

Students may be considered for admission to the Counseling Psychology program through the Department of Counseling and Special Education if they have a master's degree in counseling, guidance and counseling, psychology, school psychology, or a related field.

Course Requirements

5100:640	Techniques of Research	3
5600:643	Counseling: Theory and Philosophy	3
5600:645	Group Testing in Counseling	3
5600:647	Career Counseling: Theory and Practice	3
5600:651	Techniques of Counseling	3
3750:610	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
5600:702	Advanced Counseling Practicum	8
	(2 semesters; may be repeated for a total of 12 credits)	
3750/5600:707	Supervision in Counseling Psychology I	3
5600:708	Supervision in Counseling Psychology II	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
5600:716	Research Design in Counseling II	3
3750/5600:796	Counseling Psychology Practicum	8
5100:741	Statistics in Education	3
5100:743	Advanced Educational Statistics	3
5100:---	College of Education Foundations	6
5600:899	Doctoral Dissertation (minimum)	15
	Internship	NC
	Minimum Total Credit Hours Required	120

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 or a related field. The program allows the student a choice of three specialty areas: (a) Counselor Education; (b) Clinical Mental Health Counseling; and (c) Marriage and Family Therapy. Students in each specialty are expected to attain an advanced level of competence in the core areas of counseling, research, and their specialty. Practica and internship experiences are required in each specialty. In addition, the cognate and elective options allow students flexibility in designing a program that is consistent 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 Ph.D. Program in Guidance and Counseling is accredited by the Council for Accreditation of Counseling and Related Education Programs (CACREP), a specialized accrediting body recognized by the Council on Postsecondary Education (COPA).

Ph.D. in Guidance and Counseling Requirements:

Master's Degree¹	31-34
Foundations of Education	9
Research and Statistics	12
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
Major: Guidance and Counseling	29-32
(Must be taken after admission to the doctoral program)	
Required:	
5600:702 Advanced Counseling Practicum	12
5600:685 Internship in Counseling ²	3-6
5600:707 Supervision in Counseling Psychology I	3
5600:708 Supervision in Counseling Psychology II	3
5600: Major Electives ³	8
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 advisor.	10
Dissertation	15
Minimum Total Semester Credits	120

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

¹In 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.

²A 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% 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.

³Selected with the approval of the student's major and relate to the student's specialty area of: (1) Counselor Education, (2) Clinical Mental Health Counseling, or (3) Marriage and Family Counseling/Therapy.

For further program details and specific admission requirements, contact the Department of Counseling and Special Education.

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 coursework 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.

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

*Counseling psychology students contact adviser for requirements.

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
5100:899	Doctoral Dissertation	10-20

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 the 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

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

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 – 20 credits.

5600:610	Counseling Skills for Teachers	3
5600:631	Elementary School Guidance	3
	or	
5600:633	Secondary School Guidance	3

5600:645	Tests and Appraisal in Counseling (Prerequisite: 5100:640)	3
5600:647	Career Development and Counseling Across the Life Span	3
5600:663	Seminar in School Counseling	3
5600:695	Field Experience	1
5610:540	Developmental Characteristics of Exceptional Individuals	3
	or	
5610:604	Education and Management Strategies for Parents of Exceptional Individuals	3

- Area of concentration: 6-8 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

The course of study leads to eventual employment in community mental health centers and a wide variety of other community agencies. Note that a counselor license is usually required by most agencies. (Check counselor licensure elsewhere in this handbook.) Any changes in the agreed upon program must be approved by the student's adviser.

- Foundations (Select one course from each area)
 - Behavioral Foundations

5600:648	Individual and Family Development	3
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 - Humanistic Foundations

5600:646	Multicultural Counseling	3
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 - Research

5100:640	Techniques of Research	3
5100:741	Statistics in Education	3
- Minimum Foundation Hours Required 9

- Required Counseling Department Courses
 - Professional Orientation

5600:600	Seminar in Counseling	1
5600:635	Community Counseling	3
	Subtotal	4
 - Counseling Theory

5600:643	Counseling Theory & Philosophy*	3
5600:647	Career Counseling: Theory & Practice	3
	Subtotal	6
 - Appraisal

5600:645	Tests and Appraisal in Counseling	4
	Prerequisite: 5100:640	
	Subtotal	4
 - Counseling Process (all required)

5600:651	Techniques of Counseling*	3
5600:653	Group Counseling	4
	Prerequisite 5600:651 and 5600:643	
5600:675	Practicum in Counseling***	5
	Prerequisite 5600:653	
	Subtotal	12
 - Internship

5600:685	Internship in Counseling†	6-7
	Prerequisite 5600:675	
	Subtotal	6-7
- Minimum Department Hours Required 32-33

- Specialized Studies (required)

5600:620	Topical Seminar: Substance Abuse and Sexuality	2
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- Electives (Select a minimum of 6 hours only with help of advisor)

3750:500	Personality	4
3750:520	Abnormal Psychology	4
3750:530	Psychological Disorders of Children	4
3750:550	Learning and Cognition	4
3750:610	Psychology Core I: Organizational, Social, Applied	4
3750:620	Psychology Core II: Developmental, Perceptual, Cognitive	4

3750:700	Survey of Projective Techniques	4
3750:727	Psychology of Adulthood and Aging	4
3850:511	Social Interaction	3
3850:543	Industrial Sociology	3
5600:620	Topical Seminar	2-3
5600:649	Counseling and Personnel Services in Higher Education	3
5600:655	Marriage and Family Therapy: Theory and Techniques	3
5600:667	Marital Therapy (Prerequisite 5600:655)	3
5600:669	Systems Theory in Family Therapy (Prerequisite 5600:655)	3
5600:695	Field Experience: Master's	1-10
5600:697	Independent Study†	1-3
5600:720	Topical Seminar	2-3
5610:540	Developmental Characteristics of Exceptional Individuals	4
6400:655	Government and Business	3
6500:654	Industrial Relations	3
7400:607	Family Dynamics	3
	Subtotal	6-7
Minimum Semester Hours Required for Program		50

*Counseling Theory and Philosophy and Techniques of Counseling may be taken concurrently.
 **Must sign up with secretary one year in advance.
 †Must sign up with Internship Coordinator no later than second week of term preceding internship.
 ‡Independent Study, Field Experience, and Practicum I and II and Internship require closed class permission. You must get one from the Department prior to registering.

Counseling in Elementary or Secondary Schools

This course of study leads to eventual employment as a counselor in the public schools. Note that a school counselor must be certified as a teacher and possess three years of teaching experience. Any changes in the agreed upon program must be approved by the student's adviser.

• Foundations (select one course from each area)		
– Behavioral Foundations		
5600:648	Individual and Family Development Across the Life Span	3
– Humanistic Foundations		
5600:646	Multicultural Counseling	3
– Research		
5100:640	Techniques of Research	3
Minimum Foundation Hours Required		9
• Required Counseling Department Courses		
– Professional Orientation (select one course from each area)		
5600:600	Seminar in Counseling	1
5600:631	Elementary School Guidance	3
or		
5600:633	Secondary School Guidance	3
5600:659	Organization & Administration of Guidance Services	3
Subtotal		7
– Counseling Theory		
5600:643	Counseling Theory & Philosophy*	3
5600:647	Career Counseling: Theory & Practice	3
Subtotal		6
– Appraisal		
5600:645	Tests and Appraisal in Counseling	4
Prerequisite: 5100:640		
Subtotal		4
– Counseling Process (all required)		
5600:651	Techniques of Counseling*	3
5600:653	Group Counseling	4
Prerequisite 5600:651 and 5600:643		
5600:675	Practicum in Counseling**‡	5
Prerequisite 5600:653		
Subtotal		12
– Internship		
5600:685	Internship in Counseling†† (minimum 6 hours)	6-7
Prerequisite 5600:675		
Subtotal		6-7
Minimum Department Hours Required		35-36
• Specialized Studies (both required)		
5610:540	Developmental Characteristics of Exceptional Individuals	3
5600:620	Topical Seminar: Substance Abuse and Sexuality	2
Subtotal		5
Total Semester Hours Required for Graduation		49-50

*Counseling Theory and Philosophy and Techniques of Counseling may be taken concurrently.
 **Must sign up with Secretary one year in advance.
 †Must sign up with Internship Coordinator no later than second week of term preceding internship.
 ‡Independent Study, Field Experience, Practicum, and Internship require closed class permission. You must get one from the Department office prior to registering.

Marriage and Family Therapy

This course of study leads to eventual employment in family-based mental health settings. Note that in order to practice counseling in Ohio you must possess a counselor license. Any changes in the agreed upon program must be approved by the student's adviser.

• Foundations (select one course from each area)		
– Behavioral Foundations		
5600:648	Individual and Family Development	3
– Humanistic Foundations		
5600:646	Multicultural Counseling	3
– Research		
5100:640	Techniques of Research	3
5100:741	Statistics in Education	3
Minimum Foundation Hours Required		9
• Required Counseling Department Courses (all required)		
– Professional Orientation		
5600:600	Seminar in Counseling***	1
5600:655	Marriage and Family Therapy: Theories and Techniques	3
Subtotal		4
– Counseling Theory		
5600:667	Marital Theory (prerequisite 5600:655)	3
5600:669	Systems Theory in Family Therapy (prerequisite 5600:655)	3
5600:647	Career Development and Counseling Across the Life Span	3
Subtotal		9
– Appraisal		
5600:645	Tests and Appraisal in Counseling	4
Subtotal		4
– Counseling Process		
5600:651	Techniques of Counseling ^a	3
5600:653	Group Counseling (prerequisites 5600:651 and 655)	4
5600:675	Practicum in Counseling (prerequisite 5600:653) ^b	5
Subtotal		12
– Internship		
5600:685	Internship in Counseling (2 terms, prerequisite 5600:675)**	6-7
Subtotal		6-7
Minimum Department Hours Required		35-36
• Specialized Studies		
– Family Studies		
(Required)		
7400:651	Family and Consumer Law	3
(choose two of the following)		
7400:602	Family with Life Span Perspective	2
7400:605	Developmental Parent-Child Interactions	3
7400:675	Conceptual Frameworks in Family Ecology	3
– Sexuality (choose one)		
5600:620	Substance Abuse and Sexuality	2
7400:542	Human Sexuality	3
– Human Development and Individual Differences		
(Required)		
5600:643	Counseling Theory and Philosophy	3
(choose one of the following)		
3750:500	Personality	4
3750:520	Abnormal Psychology	4
3750:530	Psychological Disorders of Children	4
3750:550	Learning and Cognition	4
5100:721	Learning Processes	3
7400:665	Development in Infancy and Early Childhood	3
Minimum Specialized Studies Required		16-19
Minimum Hours for Marriage and Family Therapy		60-64

**A minimum of 500 client contact hours must be completed by the end of internship.
 ***Must be taken no later than the second term of the program.
^a Counseling Theory and Philosophy and Techniques of Counseling may be taken concurrently.
^b Must sign up with Secretary one year in advance.

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	Master's Thesis	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	Master's Thesis	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	4
	(this course is repeated once for a total of eight credits)	

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: Professional Topics/Issues in School Psychology	3
5620:641	Field Seminar II: Low Incidence/Related Inquiries	3

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	2

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 coursework or six hours of work-shop 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 coursework 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 coursework.

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 coursework 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	Master's Thesis	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: Special Education Supervisor.

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 coursework:

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	3
5700:740	Theories of Educational Supervision	3

*May be waived if completed as undergraduate.

Educational Foundations and Leadership

Educational Administration

The Department of Educational Administration and Leadership 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
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
5900:700	Introductory Administrative Colloquium in Higher Education	1
5900:720	Finance and Higher Education	3
5900:721	Law and Higher Education	3
5900:730	Curriculum and Program Planning in Higher Education	3
5900:800	Advanced Administrative Colloquium in Higher Education	1
5900:801	Internship in Higher Education	2
5900:802	Internship in Higher Education Seminar	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	3
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	2
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 and Leadership 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* or Field Experience I: Secondary Administration*	2
5700:686	Field Experience I: Secondary Administration* or Field Experience for Supervisors*	2
5700:695	Field Experience for Supervisors*	3
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* or Field Experience I: Secondary Administration*	2
5700:686	Field Experience I: Secondary Administration* or Field Experience for Supervisors*	2
5700:695	Field Experience for Supervisors*	3

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* or	2
5700:686	Field Experience I: Secondary Administration* or	2
5700:695	Field Experience for Supervisors*	3
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

**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* or	2
5700:686	Field Experience I: Secondary Administration* or	2
5700:695	Field Experience for Supervisors*	3
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

**Administrative Specialist:
Pupil Personnel Administration**

• Foundation Studies – nine credits.*

• Required courses:

5600:631	Elementary Counseling** or	3
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* or	2
5700:686	Field Experience I: Secondary Administration* or	2
5700:695	Field Experience for Supervisors*	3
5700:706	Collective Bargaining and Employee Relations*	2
5700:707	The Superintendency*	3
5700:895	Field Experience: The Superintendency**	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
5700:684	Field Experience I: Elementary Administration* or	2
5700:686	Field Experience I: Secondary Administration* or	2
5700:695	Field Experience for Supervisors*	3
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:
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* or	2
5700:686	Field Experience I: Secondary Administration* or	2
5700:695	Field Experience for Supervisors*	3
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
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• Electives, as needed, to bring the program to a total of 60 graduate semester hours.

*Required only of an elementary student.

**Required only of a secondary student.

†Required only of a special education student.

Supervisor

- Foundation Studies – nine credits.

- Major field:

5200:630	Elementary School Curriculum and Instructions*	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 for Supervisors	3
5700:740	Theories in Educational Supervision	3

- Electives – With the approval of the adviser, the student will select at least one of the following courses and others to fulfill the program minimum of 30 credits:

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

*Required only of an elementary student.

**Required only of a secondary student.

†Required only of a special education student.

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 and Leadership. 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 coursework.

The program incorporates coursework 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.

*Two seminars are required.

Elementary Education

Students seeking a master's degree in elementary education can follow several options. A 30-credit program is available for students who contemplate pursuing the Ph.D. in the future. This 30-credit program includes the completion of a master's thesis under the direction of a faculty adviser. The thesis provides the student with research/scholarly writing experiences that form the foundation for further study at the doctoral level.

30 Credit Option

- Foundation studies – nine credits.

- Elementary Education:

5200:538	Materials and Laboratory Techniques in Elementary School Mathematics	3
5200:630	Elementary School Curriculum and Instruction	2
5200:631	Trends in Elementary Education	2
5250:680	Trends in Reading Instruction	2
5200:699	Master's Thesis	4-6
5200:780	Seminar in Elementary Education (two seminars required)	4

- Electives: Total to fulfill program minimum of 30 credits and to be taken from 5200, 5250, or 5630 coursework. 2-4

For persons wishing to gain further knowledge of the elementary school curriculum and remain in the elementary classroom, the 36-credit program is available. This program requires a field experience that provides an opportunity for the teacher to experiment with newly acquired skills and knowledge under the direction of a faculty adviser.

36 Credit Option

- Foundation studies – nine credits.

- Elementary Education:

5200:538	Materials and Laboratory Techniques in Elementary School Mathematics	3
5200:630	Elementary School Curriculum and Instruction	2
5200:631	Trends in Elementary Education	2
5250:680	Trends in Reading Instruction	2
5200:695, 696	Field Experience: Master's	2
5200:780	Seminar in Elementary Education	2

- Electives: Total to fulfill program minimum of 36 credits. Electives may be taken in one concentrated area or from several areas, but must contain courses from 5200, 5250, or 5630 as listed in the bulletin.

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 early childhood, elementary, junior high, middle, secondary content, secondary developmental, and special education teachers working in a diagnostic-prescriptive, clinical, or adult program. The programs of study provide opportunities to study those aspects of reading that relate to the professional goals and interests of the student.

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

The 30-credit option is designed for students who contemplate pursuing a doctoral program in the future; this option requires a thesis. The 36-credit option is designed for students who wish to enhance their knowledge of reading instruction and remain in a classroom setting to use their newly acquired knowledge. This program requires a field experience under the direction of a member of the elementary education faculty.

Neither of these degree options lead to certification in reading in Ohio. Persons wishing this certification must complete additional courses as specified below.

30 Credit Option

- Foundation studies – nine credits.
- Reading:

5200:699	Master's Thesis	4-6
5200:780	Seminar in Elementary Education: Children's Literature	2
5250:540	Developmental Reading in the Content Areas – Elementary	3
5250:680	Trends in Reading Instruction	2
5250:681	Diagnosis and Correction of Reading Problems	5
5250:682	Clinical Practices in Reading	5

36 Credit Option

- Foundation studies – nine credits
- Reading

5200:695, 696	Field Experience: Master's	2
5200:780	Seminar in Elementary Education: Children's Literature	2
5250:540	Developmental Reading in the Content Areas – Elementary	3
5250:680	Trends in Reading Instruction	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

Physical Education and Health Education

Athletic Training for Sports Medicine

The Athletic Training program, requiring 35 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. Students interested in this program should not assume they are automatically admitted into it. Admission is based on an interview process conducted by the athletic trainer staff. If interested in this program, you should contact the head athletic trainer (MH-77, ext. 6056) as soon as possible so that you can be fully apprised of your individual situation.

- Foundation Courses:

5100:640	Techniques of Research	3
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- Required Courses

3100:561	Human Physiology	4
3100:562	Human Physiology	4
3100:565	Advanced Cardiovascular Physiology	3
5550:605	Physiology of Muscular Activity and Exercise	3
5550:606	Statistics: Qualitative and Quantitative Methods	3
5550:541	Advanced Athletic Injury Management	4
5550:542	Therapeutic Modalities and Equipment in Sports Medicine	3
5550:680	Special Topics: Pharmacology for Sports	3

At least two (2) credit hours from the following:

- | | | |
|----------|----------------------------|-----|
| 5550:695 | Field Experience: Master's | 2-6 |
| | or | |
| 5550:698 | Master's Problem | 2-4 |
| | or | |
| 5550:699 | Master's Thesis | 4-6 |

- Electives to be taken with permission of the adviser (at least one course from among the following is required):

5100:520	Introduction to Instructional Computing	3
5550:536	Foundations and Elements of Adapted Physical Education	3
5550:555	Motor Development of Special Populations	3
5550:601	Administration of Physical Education, Intramurals, and Athletics	3
5550:609	Motivational Aspects of Physical Activity	3
5550:680	Special Topics: Laboratory Instrumentation	3
7400:587	Sports Nutrition	3

Students who enter the NATA program with undergraduate training in the required courses listed above (section II) will take course work from the electives listed (after consultation with their adviser) in a number sufficient to meet the 35 hour program requirement.

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 Foundation Courses:

5100:640	Techniques of Research	3
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Remaining six (6) credits to be chosen, with approval of adviser, from 5100:500 or 5100:600 course offerings or 5550:606 *Statistics: Qualitative and Quantitative Methods*.

- Required courses:

5560:550	Application of Outdoor Education to the School Curriculum	4
5560:552	Resources and Resource Management for the Teaching of Outdoor Education	4
5560:556	Outdoor Pursuits	or
	or	
5560:605	Outdoor Education: Special Topics	2-4
5560:600	Outdoor Education: Rural Influences	3
5560:695	Field Experience	1-6
	(at least 2 credits if only option selected)	
	or	
5560:698	Master's Problem	2-4
	or	
5560:699	Master's Thesis	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 post-baccalaureate and in-service physical educators. The theme of the program is "physical educator as decision-maker." Training received in this program comes from two (2) areas: the foundations (9 cr.) and the program studies area of physical education (21 cr.). The emphasis in this curriculum is to provide answers to the questions "what I can learn about teaching and what decisions do I face as a professional educator." Successful completion of this program would meet a tenure requirement for Ohio public schools as well as for other states. Each student will be assigned an adviser who should be consulted with on a regular basis. In fact, adviser approval is required on certain course work.

- Required Foundation Courses:

5100:600	Philosophies of Education	3
	or	
5100:604	Topical Seminar in the Cultural Foundations	3
5100:620	Behavioral Bases of Education	3
	or	
5100:624	Seminar in Human Development and Education	3
5100:640	Techniques of Research	3
- Required Department Courses:

5550:536	Foundations and Elements of Adapted Physical Education	3
	or	
5550:555	Motor Development of Special Populations	3
5550:601	Administration of Physical Education, Athletics, & Intramurals	3
5550:603	Curriculum Planning in Health and Physical Education	2
5550:605	Physiology of Muscular Activity and Exercise	3
5550:606	Statistics: Qualitative and Quantitative Methods	3
5550:608	Supervision of Physical Education	2
5550:609	Motivational Aspects of Physical Activity	3
5550:695	Field Experience: Master's	or
	or	
5550:698	Master's Problem	or
	or	
5550:699	Master's Thesis	2 (minimum)

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

Option: Adapted Physical Education

The Adapted Physical Education option is designed for advanced study about teaching physical education to handicapped individuals. Emphasis is given to a developmental model using assessment and programming of motor skills which lead to increased educational, social, vocational, and lifetime fitness development. The program combines research and clinical/field experiences to provide schools and agencies with expertise needed to improve their programs. A minimum of 34 graduate credits is required. Completion of this program will also afford the student an Ohio validation for teaching this content area.

- Required 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 in Human Development and Education	3
5100:640	Techniques of Research	3

- Required Department Courses:

5550:536	Foundations and Elements of Adapted Physical Education	3
5550:551	Assessment and Evaluation in Adapted Physical Education	3
5550:555	Motor Development of Special Populations	3
5550:605	Physiology of Muscular Activity and Exercise	3
5550:606	Statistics: Qualitative and Quantitative Methods	3
5550:695	Field Experience: Master's	2
5610:565	Neuromotor Aspects of Physical Disabilities	3
5610:567	Management of Strategies in Special Education	3

- At least two (2) credits from among the following:

5550:695	Field Experience: Master's	1-6
	or	
5550:698	Master's Problem	2-4
	or	
5550:699	Master's Thesis	4-6

Option: Exercise Physiology/Adult Fitness

This graduate program, requiring a minimum of 34 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.

- Required Foundation Courses:

5100:620	Behavioral Bases of Education	3
	or	
5100:624	Seminar in Human Development and Education	3
5100:640	Techniques of Research	3

- Required Department Courses:

3100:561	Human Physiology	4
3100:562	Human Physiology	4
3100:565	Advanced Cardiovascular Exercise	3
5550:605	Physiology of Muscular Activity and Exercise	3
5550:606	Statistics: Qualitative and Quantitative Methods	3
5550:680	Special Topics in Health and Physical Education: Laboratory Instrumentation	3
7400:587	Sports Nutrition	3

- At least two (2) credits from among the following:

5550:695	Field Experience: Master's	
	or	
5550:698	Master's Problem	
	or	
5550:699	Master's Thesis	2 (minimum)

- Electives: Select at least one (1) course from among the following and have adviser approval.

5100:520	Introduction to Instructional Computing	3
5100:741	Statistics in Education	3
5100:743	Advanced Education Statistics	3
5550:601	Administration of Physical Education, Athletics and Intramurals	3
5550:609	Motivational Aspects of Physical Activity	3

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 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 teaching 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	
	or	
5300:699	Master's Thesis	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.

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

Secondary Education (Certification)

This program is open to highly qualified students who hold the B.A. or B.S. degree. All requirements for certification must be met including the 600 hours of field and clinical/diagnostic experience.

- Foundation Courses (10 credits):

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
5100:642	Topical Seminar in Measurement and Evaluation	3
5100:695	Field Experience: Master's	1

- Secondary Education Seminar (2 credits):

5300:780	Seminar in Secondary Education	2
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- Secondary Education (16):

5300:695	Field Experience: Master's	1
5300:530	Instructional and Management Practices	3
5300:619	Secondary School Curriculum and Instruction	2
	or	
5300:721	Supervision of Instruction in the Secondary School	2
	or	
5300:780	Seminar in Secondary Education	2
5300:525	Advanced Microcomputer Applications in the Secondary Schools	3
5300:625	Reading Programs in Secondary Schools	3
5300:697	Independent Study	3
5300:695	Field Experience: Master's	1

- Area of Concentration (9):

Select 9 credits at 500-level or above.

- Field Experience (Student Teaching) (7 credits):

5300:695	Field Experience: Master's	6
5300:695	Field Experience: Master's	1

- A comprehensive examination is required.

Total Program: 44

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:

5400:505	Occupational Education for Youth and Adults	3
	or	
5400:510	The Two-Year College	3
5400:530	Curriculum Development in Technical Education	2
5400:535	Instructional Techniques in Technical Education	4
- 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)

College of Business Administration

Stephen F. Hallam, Ph.D., *Dean*

James E. Inman, J.D., *Associate Dean*

Kenneth E. Mast, D.B.A., *Assistant Dean and*

Director of Undergraduate Programs

John Daniel Williams, D.B.A., *Assistant Dean and*

Director of Graduate Programs

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 1200 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 full-time 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; and the percentile ranking on the GMAT.

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 44325-4805 (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 monthly and the applicant will be informed in writing of the GAC's decision within one week of the meeting.

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.

Transfer Policy

The College of Business Administration will permit 9 credits of comparable graduate credits to be transferred into any of the graduate business programs (10 law school credits into the J.D./M.Taxation program). These credits must be pre-approved by the director of graduate programs in the C.B.A. This 9 credit policy also applies to second degree applicants.

Second Degree

For a student who has already obtained one master's degree in business, it is possible to pursue another degree in the college provided that: (1) no second M.B.A. is to be obtained; (2) the degree sought is not in the same functional discipline; (3) the desired program (degree curriculum) is specifically approved in advance by the director of graduate programs in business; and (4) not fewer than 21 new credits are earned for the second degree.

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. The program consists of 58 graduate credits. Foundation courses may be waived for those who have had recent study in the areas. Foundation and advanced courses can be taken concurrently provided that all prerequisites have been met.

• Foundation Courses

All are required unless waived at the time of admission:

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 Organizational Behavior	3
6500:601	Quantitative Decision Making	3
6500:602	Computer Techniques for Management	3
6600:600	Marketing Concepts	3

• Functional Core (12 credits):

6200:610	Accounting Management and Control	3
6400:674	Financial Management and Policy	3
6500:670	Operations Management	3
6600:620	Strategic Marketing Management	3

• Professional Core (4 credits):

6700:690	Professional Responsibility	1
6700:692	International Business	1
6700:694	Applied Business Documentation and Contact	1
6700:696	Special Topics in Professional Development	1

• Quantitative Tools (3 credits):

Student must complete one of the following courses:

6200:664	Research and Quantitative Methods in Accounting	3
6400:650	Administering Costs and Prices	3
6500:662	Applied Operations Research	3
6600:640	Business Research Methods	3

• Concentration (9 credits):

The student must select 9 credits in a field of concentration (accounting, finance, management, marketing, international business).

- Free Electives (3 credits)
Student must select 3 credits of free electives outside area of concentration. Approval of Director is required.
- Integrative (3 credits)

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

Foundation Core	24
Functional Core	12
Professional Core	4
Quantitative Tools	3
Concentration	9
Free Elective	3
Integrative	3
Total Program	58

If the Foundation Core Courses are all waived, the program is 34 credits in length.

Note: International Business concentration requires reading and conversational proficiency in one language other than English.

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 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 an ability to identify and solve tax problems.

The Master of Taxation curriculum is structured in two phases of course work: Phase I: foundation course, and Phase II: required courses. A minimum of 30 semester credits is required for the degree. The foundation Phase I course may be waived for those who have had recent study in the subject area.

Phase I

- Postbaccalaureate Foundation:

6200:430/530	Taxation I	3
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Phase II

- Required:

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

Twenty credits of which at least 14 must be in taxation, 6200:641-693

Taxation courses	14 credits
Any CBA courses	6 credits
Total Required Credits	30-33

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 Organizational Behavior	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	Applied Operations Research	3
6500:695	Business Strategy and Policy: Domestic and International	3

Options:

Choose a concentration from the 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	Data Management and Communication	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	Analysis and Design of Business Systems	3
6500:644	Managerial Decision Support and Expert Systems	3
6500:678	Project Management	3

Human Resource Management

- Concentration Courses:

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

Materials Management

- Concentration Courses:

6500:675	Materials Management	3
6500:676	Management of Production and Operations	3

- Concentration Electives (Choose three):

6500:641	Data Management and Communication	3
6500:642	Systems Simulation	3
6500:651	Productivity and Quality of Worklife Issues	3
6500:670	Operations Management	3
6500:673	Quality and Productivity Techniques	3
6500:678	Project Management	3

Health Services Administration

The Department of Management has made the Master of Science in Management-Health Services program inactive. No students will be admitted to this program until further notice.

**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. Maximum of six credits to be waived.

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 44325-2901). A baccalaureate degree is required.

Degree Requirements

A student is required to fulfill the requirements of the School of Law, 87 credits, which includes 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 (Foundation) courses (unless waived because of prior undergraduate credits earned) and 25 credits for M.B.A. of advanced courses in the CBA plus six credits transferred from the School of Law. The Master of Taxation program consists of 20-24 credits of advanced courses in the CBA plus 10 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 102 (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 Foundation 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.

J.D./M.B.A. students may transfer nine credits of School of Law courses into the M.B.A. program. Six credits must be in their area of concentration and must be selected from the courses listed below. Related courses not listed under concentrations may transfer with approval of the director of graduate programs in Business Administration. Three credits of free electives may be chosen from other business-related law courses and must be approved by the director of graduate programs in Business Administration.

Law Courses to be used as MBA Concentration Courses

Choices for Concentration Electives:

Accounting (choose 6 credits)

9200:639	Estate and Gift Taxation
9200:640	Individual Taxation
9200:641/642	Corporate Taxation I, II
9200:665	Taxation of Partnerships and S Corporations
9200:674	Current Problems in Taxation
9200:675	Special Problems in Estate Planning
9200:680	Qualified Pensions and Profit Sharing
9200:685/686	Wills, Trusts and Estates I, II

Finance (choose 6 credits)

9200:629	Commercial Law II
9200:635	Bankruptcy Law
9200:639	Estate and Gift Taxation
9200:652	Land Use Planning
9200:671	Securities Regulation
9200:675	Special Problems in Estate Planning
9200:680	Qualified Pensions and Profit Sharing
9200:685/686	Wills, Trusts and Estates I, II
9200:691	International Investments

International Business (choose 6 credits)

9200:649	International Law
9200:676	International Trade
9200:691	International Investments and the European Economic Community

Management (choose 6 credits)

9200:637	Equal Opportunity Law
9200:650	Labor and Employment Law
9200:651	Labor Arbitration and Collective Bargaining
9200:659	Lawyer as Negotiator
9200:660	Workers' Compensation
9200:672	Seminar in Business Planning
9200:679	Labor Law

Marketing (choose 6 credits)

9200:627	Commercial Law I
9200:659	Lawyer as Negotiator
9200:662	Media Law
9200:667	Patent, Trademark and Copyright Law
9200:672	Seminar in Business Planning
9200:683	Seminar in Product Liability
9200:684	Sports and Entertainment Law

College of Fine and Applied Arts

Linda Moore, Ph.D., *Dean*
 DuWayne H. Hansen, D.M.E., *Associate Dean*
 William H. Seaton, 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 options in child development; child life; clothing, textiles and interiors; family development; and food science. 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.
- Have completed the general Graduate Record Examination within the five years preceding the application and achieved a minimum total score of 1200 on the three parts of the GRE.
- Submit a letter of personal career goals.
- Offer two letters of recommendation if desired.

The graduate faculty of the School of Home Economics and Family Ecology 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 six options, 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, project 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 for internship.
- Pass an oral examination covering the thesis or internship report.

Foundation Courses

- Required by all program options:

7400:604	Orientation to Graduate Studies in Home Economics and Family Ecology	1
7400:680	Historical and Conceptual Bases of Home Economics and Family Ecology	3
7400:685	Research Methods in Home Economics and Family Ecology	3

Child Development Option

- Core Courses:

7400:605	Developmental Parent-Child Interactions	3
7400:610	Child Development Theories	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 American Families	3
7400:548	Before and After School Child Care	2
7400:560	Organization and Supervision of Child-Care Centers	3
7400:596	Parent Education	3
7400:607	Family Dynamics	3
7400:616	Infant and Child Nutrition	3
7400:651	Family and Consumer Law	3
7400:660	Programming for Child-Care Centers	3

- Cognate Electives

Select 7 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	Master's Thesis	5
	Total	40

Child Life Option

- 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	Parent Education	3
7400:605	Developmental Parent-Child Interactions	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 of Thesis (Select One):

7400:695	Internship	
7400:699	Master's Thesis	
	Total	40

Clothing, Textiles and Interiors Option

- Core Courses:

7400:634	Materials Culture Studies	3
7400:639	Theories of Fashion	3
7400:677	Social Psychology of Dress and the Near Environment	3

- Options Electives:

7400:518	History of Interior Design I	4
7400:519	History of Interior Design II	4
7400:523	Professional Image Analysis	3
7400:525	Advanced Textiles	3
7400:527	Textile and Apparel Industry	3
7400:533	Residential Design	3
7400:535	Principles and Practices Interior Design	3
7400:536	Textile Conservation	3
7400:537	Historic Costume to 1800	3
7400:538	History of Fashion Since 1780	3
7400:631	Problems in Design	1-6
7400:696	Individual investigation in Home Economics and Family Ecology	1-6

- Cognate Electives:

Select 6 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	Master's Thesis	5
	Total	40

Family Development Option

• Core Courses:

7400:602	Family in Life-Span Perspective	3
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 American Families	3
7400:546	Culture, Ethnicity and the Family	3
7400:596	Parent Education	3
7400:601	Families in Transition	2
7400:603	Family Relationships in Middle and Later Years	3
7400:605	Developmental Parent-Child Interactions	3
7400:610	Child Development Theories	3

• Cognate Electives:

Select 7 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	Master's Thesis	5
	Total	40

Food Science Option

• 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	Master's Thesis	5
	Total	40

Nutrition and Dietetics

A program of study is offered leading to the Master of Science in Nutrition and Dietetics. 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.
- Have completed the general Graduate Record Examination within the five years preceding the application and achieved a minimum total score of 1200 on the three parts of the GRE.
- Submit a letter of personal career goals.
- Offer two letters of recommendation if desired.

The graduate faculty of the School of Home Economics and Family Ecology 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 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.
- 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 project.
- Complete a thesis or a project. 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 project option involves the design, development, implementation and evaluation of original and creative programs and/or resource materials. A written proposal for the thesis or project option cannot be submitted until the successful completion of a comprehensive examination.
- Pass an oral examination covering the thesis or project.

Foundation Courses

• Required by all program options:

7400:604	Orientation to Graduate Studies in Home Economics and Family Ecology	1
7400:680	Historical and Conceptual Bases of Home Economics and Family Ecology	3
7400:685	Research Methods in Home Economics and Family Ecology	3

• Core Courses:

7400:624	Advanced Human Nutrition I	3
7400:625	Advanced Human Nutrition II	3

Electives (9 to 12 credits required)

Select with the approval of adviser from among the following. At least 2 courses must be selected from Biology (3100) or Chemistry (3150). If a nutrition course has been taken at the undergraduate level, it may not be used at the graduate level.

3100:561	Human Physiology I	4
3100:562	Human Physiology II	4
3100:565	Cardiac Physiology	3
3100:584	Pharmacology	3
3100:670	Medical Physiology, Pathophysiology, and Pharmacology	3
3100:686	Research in the Biology of Aging	3
3150:501	Biochemistry Lecture I	3
3150:502	Biochemistry Lecture II	3
7400:520	Experimental Foods	3
7400:524	Nutrition in the Life Cycle	3
7400:574	Cultural Dimensions of Foods	3
7400:576	Developments in Food Science	3
7400:580	Community Nutrition I - Lecture	3
7400:582	Community Nutrition II - Lecture	3
7400:587	Sports Nutrition	3
7400:588	Practicum in Dietetics	1-3
7400:640	Nutrition in Diminished Health	3

Cognate Electives (8 to 11 credits required)

Select with the approval of adviser from among the following or other courses that strengthen the student's goals.

3470:664	Statistics for the Health Sciences	4
3850:678	Social Gerontology	3
5600:651	Techniques of Counseling	3
6500:600	Management and Organizational Behavior	3
6500:602	Computer Techniques for Management	3

Note: The M.S. in Nutrition and Dietetics is not a route to becoming a Registered Dietitian (R.D.). Students interested in becoming R.D.s should contact the School for proper course selection, some of which can be done at the graduate level.

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 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	Master's Thesis	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	Master's Thesis	4-6
- Additional music/education courses – select 17-19 credits with approval music education and graduate advisers

7500:675	Seminar in Music Education	1-3
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—/7—	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 advisers

7500:675	Seminar in Music Education	1-3
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	Master's Thesis	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
7500:566	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

**Two semesters ensemble participation required for degrees completed in two semesters. Four semesters ensemble participation required for degrees completed in four semesters.

Performance Option in Winds, String 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	

• 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

• 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) (Select either 7500:562 or 7500:633)	2
7500:562	Repertoire and Pedagogy: Organ or	2
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.

*It is recommended that each student's graduate committee recommend the appropriate elective credits.

**Two semesters ensemble participation required for degrees completed in two semesters. Four semesters ensemble participation required for degrees completed in four semesters.

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	Master's Thesis	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.

**Two semesters ensemble participation required for degrees completed in two semesters. Four semesters ensemble participation required for degrees completed in four semesters.

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.

Continuous Enrollment Requirement: Regarding the completion of 7800:699 *Master's Thesis*, students must enroll for one credit of 7800:690 each Fall and Spring semester until the thesis project is completed (approved).

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
	or	
7800:662	Seminar in Scene 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
7800:699	Master's 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 Directing	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	Master's 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	Master's Thesis	6
	General Theatre Electives	9

- Complete an oral defense of the thesis or production.

Arts Administration Option

- Complete a minimum of 42 credits.
- Required theatre arts courses (29-32) credits:

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 Arts Administration	3
7800:698	Internship	3-6
7800:699	Master's Thesis (6 credits required)	3-6
- Required business courses (6 credits):

6500:600	Management and Production Concepts	3
6600:600	Marketing Concepts	3

- Electives in related fields (4-7 credits):
Options here include course work in business, computer science, urban studies, and music.
- Complete an oral defense of the thesis.
- General Electives 0-3

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 licensure by the State of Ohio Board of Speech-Language 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 for entrance into the program only for Fall Semester. Applications for admission should be received by February 15th.

Degree Requirements

- The master's thesis is optional for students in speech-language pathology and audiology. All students will successfully complete a course of study with a minimum of 38 credits, two of which may be thesis credits for students electing the thesis option. Students in the non-thesis option also will write comprehensive examinations during their final semester. Academic requirements within the school include:

For speech-language pathology majors:

7700:611	Research Methods in Communicative Disorders I	3
7700:628	Topics in Differential Diagnosis of Speech and Language Disorders	2
7700:650	Advanced Clinical Practicum: Differential Diagnosis	1

At least two credits from the following:

7700:651	Advanced Clinical Practicum: Voice	1
7700:652	Advanced Clinical Practicum: Fluency	1
7700:655	Advanced Clinical Practicum: Articulation	1
7700:656	Advanced Clinical Practicum: Language	1

For audiology majors:

7700:611	Research Methods in Communicative Disorders I	3
7700:612	Research Methods in Communicative Disorders II	2
	or	
7700:699	Master's Thesis	4-6
7700:654	Advanced Clinical Practicum: Diagnostic Audiology	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-language pathology, and the speech-language pathology student must take 4 credits in audiology. It is recommended that the speech-language pathology major elect 7700:639 *Advanced Clinical Testing* to fulfill this requirement.

- The following limitations on work toward the degree may be exceeded only with the approval of two-thirds of the school'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 (5610:692 or 5610:693) 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

The Master of Social Work Program is a joint degree program administered by Cleveland State University and The University of Akron. The two-year program began in January 1995 on a one-time basis with a new class beginning each Fall Semester on both campuses. Distance learning technology, which utilizes interactive video and audio systems, will link faculty and students at the two institutions. The degree program is in candidacy status with the Council on Social Work Education.

Students accepted into the graduate program leading to a master's degree in social work must register only for 600 and 700 level courses. Graduate courses taken at the 500 level are not applicable for the graduate degree program in social work, but can be used (with approval) as an elective for other University of Akron graduate programs.

Admission Requirements:

- Meet the general Graduate School requirements for admission.
- An undergraduate major in social work or a related field.
- Have a minimum grade point average of 3.00 in social work and behavioral science courses taken prior to application for admission. A minimum of 8 courses is required in this area.
- Submit 3 letters of reference.
- Submit an essay of 3-5 typed pages explaining:
 - a) why he/she wants to be a social worker;
 - b) why a graduate degree is felt to be necessary to fulfill his/her personal or professional objectives;
 - c) his/her views regarding diversity in society;
 - d) a situation in which he/she was the recipient/provider of help, emotionally, socially, or economically.

A description of any social work/human service work experience must be submitted.

Program Requirements:

- Complete a minimum of 60 graduate credits of approved courses in social work. Up to 9 credits of graduate-level electives outside the department may be included in the program. There is no foreign language requirement.
- Complete an approved program of courses which include the following required courses:

First Year Professional Foundation:

- Fall Semester

7750:604	Social Work Practice with Small Systems	3
7750:606	Foundation Field Practicum	3
7750:622	Fundamentals of Research I	3
7750:631	Human Behavior and Social Environment: Small Social Systems	3
7750:646	Social Welfare Policy I	3

- Spring Semester

7750:605	Social Work Practice with Large Systems	3
7500:606	Foundation Field Practicum	3
7750:611	Dynamics of Racism and Discrimination	3
7750:623	Fundamentals of Research II	3
7750:632	Human Behavior and Social Environment: Large Systems	3

Second Year Concentrations (Direct Practice):

- Fall Semester

7750:704	Advanced Practice with Small Systems I	3
7750:706	Advanced Field Practicum	3
7750:747	Social Welfare Policy II	3
7750:763	Psychopathology and Social Work	3
	One elective	3

- Spring Semester

7750:705	Advanced Practice with Small Systems II	3
7750:706	Advanced Field Practicum	3
7750:764	Single System Design	3
	Two electives	6

Second Year Concentrations (Macro Practice):

- Fall Semester

7750:706	Advanced Field Practicum	3
7750:747	Social Welfare Policy II	3
7750:773	Introduction to Community Organization and Planning	3
7750:774	Community, Economic Systems and Social Policy Analysis	3
	One elective	3

- Spring Semester

7750:706	Advanced Field Practicum	3
7750:771	Social Work Administration	3
7750:772	Strategies of Community Organization	3
7750:775	Program Evaluation	3
	One elective	3

College of Nursing

V. Ruth Gray, R.N., Ed.D., *Dean*

Dolores Bower, R.N., Ph.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*

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*

Upon completion of the program graduates will be able to:

- Incorporate theories and advanced knowledge into nursing practice.
- Demonstrate competence in selected role(s).
- Identify researchable nursing problems and participate in research studies in advanced nursing practice.
- Use leadership, management, and teaching knowledge and competencies to influence nursing practice.
- Assume responsibility for contributing to improvement in the delivery of health care and influencing health policy.
- Assume responsibility for contributing to the advancement of the nursing profession.

Admission

- Baccalaureate degree in nursing from NLN-accredited nursing program.**
- 3.00 GPA on a 4.00 scale for all previous college work.
- Miller Analogies Test taken within the last five years with a minimum score of 50 or GRE taken within the last five years. During the past three years, the range of GRE scores has been: verbal 400-614, quantitative 400-695, and analytical 400-640.
- Three (3) letters of reference from a recent employer; a member of the nursing profession; a former faculty member.
- 300-word essay describing professional goals.
- Interview prior to admission to the program.
- Current state of Ohio license to practice nursing and evidence of malpractice insurance.
- Prerequisite course requirements: Undergraduate Statistics, Nursing Research, Basic Health Assessment and Computer Skills. Graduate Level Statistics.

A one year experience in an area where critical care and emergencies occur is required for all students admitted to the nurse anesthesia specialty.

Applicants who are certified nurse practitioners will be evaluated and have their program planned on an individual basis.

Admission Procedures

The student secures application for Graduate School from the Office of the Dean of the Graduate School, The University of Akron, or the Office of Student Affairs, College of Nursing. Criteria specific for admission to the Graduate Nursing Program may be secured from the Associate Dean of the Graduate Program in Nursing or the Office of Student Affairs.

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 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 when the file is complete to facilitate the admissions process.

Instructional Program

The Master of Science in Nursing curriculum includes 36 credit hours of study and focuses on nursing care of vulnerable populations in episodic and long term care situations. Areas of concentration include Adult Health Nursing, Liaison Mental Health Nursing, Child and Adolescent Health Nursing, and Gerontological Nursing. Graduates are prepared for advanced practice roles in education, administration or clinical nurse specialization. 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.

The Master of Science program in Nurse Anesthesia includes 44 credit hours of study and focuses on the master's preparation of certified registered nurse anesthetists (CRNA).

Nursing Core

The core consists of 17 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 I* and 8200:699 *Master's Thesis* or 8200:618 *Nursing Inquiry II*.

*National League for Nursing.

**A baccalaureate degree in nursing from a foreign university which is recognized by The University of Akron.

Advanced Practice Roles

Options are provided for roles of educator, administrator, clinical nurse specialist, or nurse practitioner.

Electives

Students may choose to enroll in cognate electives. The graduate nursing curriculum requires 36 credit hours of study. Additional credits will provide the opportunity to individualize and strengthen the major.

Core courses required of all students:

8200:608	Pathophysiological Concepts of Nursing Care †	3
8200:603	Theoretical Basis for Nursing	3
8200:605	Computer Applications in Nursing	2
8200:607	Policy Issues in Nursing	2
8200:613	Nursing Inquiry	3
8200:618	Nursing Inquiry II	4-6
	or	
8200:699	Master's Thesis	1-6

Functional role courses selected by students based upon area of specialty.

• **Education:***

8200:682	Nursing Curriculum Development	3
8200:683	Evaluation in Nursing Education	3
8200:684	Practicum: The Academic Role of the Nurse Educator	6

• **Administration:**

6200:632	Fiscal Management in Nursing Administration	3
8200:630	Resource Management in Nursing Settings	3
8200:635	Organizational Behavior in Nursing Settings	3
8200:638	Practicum Administration I	5
8200:639	Practicum Administration II	5

• **Nurse Anesthesia****

The Anesthesia Track is accredited by the Council on Accreditation of Nurse Anesthesia Programs.

3100:561	Human Physiology I	4
3100:562	Human Physiology II	4
8200:640	Scientific Components of Nurse Anesthesia	3
8200:641	Pharmacology for Nurse Anesthesia I	3
8200:643	Principles of Anesthesia I	4
8200:644	Pharmacology for Nurse Anesthesia II	3
8200:645	Principles of Anesthesia II	4
8200:647	Professional Role Seminar	2
8200:649	Nurse Anesthesia Residency	0

• **Child and Adolescent Health*****

8200:651	Child and Adolescent Health Nursing I	3
8200:655	Child and Adolescent Health Nursing II	4
8200:656	Pharmacology for Child and Adolescent Health Nursing	3
8200:657	Child and Adolescent Health Nursing III	4
8200:659	Practicum: Child and Adolescent Health Nursing	3

• **Liaison-Community Mental Health Nursing *****

3100:695	Psychopharmacology	2
8200:661	Liaison-Community Mental Health Nursing I	3
8200:665	Liaison-Community Mental Health Nursing II	4
8200:667	Liaison-Community Mental Health Nursing III	4
8200:669	Practicum: Liaison-Community Mental Health Nursing	3

• **Adult Health**

8200:671	Adult Health Nursing I	3
8200:675	Adult Health Nursing II	4
8200:677	Adult Health Nursing III	4
8200:679	Practicum: Adult Health Nursing	3

• **Gerontological Nursing*****

8200:621	Gerontological Nursing I	3
8200:625	Gerontological Nursing II	4
8200:627	Gerontological Nursing III	4
8200:629	Practicum: Gerontological Nursing	3

• **Clinical Nurse Specialization*****

8200:615	Advanced Clinical Practice Seminar	2
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†Cognate electives may be substituted for this course for the Administrative track.

*Students in education are required to take an additional 7 credits of Advanced Nursing in Child and Adolescent Health, Liaison Mental Health, Adult Health, or Gerontological Nursing.

**In addition to the listed courses, all nurse anesthesia students must complete a 15 month residency.

***Students in Child and Adolescent Health, Liaison Mental Health, Adult Health, or Gerontological Nursing are required to take the 2 credit hour Advanced Clinical Practice Seminar.

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 admissions 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.
- Miller Analogies Test taken within the last five years with a minimum score of 50 or Graduate Record Exam (GRE) taken within the last five years. During the past three years, the range of GRE scores has been: verbal 400-614, quantitative 400-695, and analytical 400-640.
- 300-word essay describing professional goals.
- Interview with selected faculty members and submission of a portfolio.
- Computer skills.

Curriculum

The R.N.-M.S.N. Sequence 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 67 hours of prerequisite undergraduate coursework prior to acceptance into the Sequence. The R.N.-M.S.N. Sequence consists of bridge courses totaling 21 hours of upper-division baccalaureate coursework and a minimum of 36 hours of graduate coursework. Students will receive 46 hours of undergraduate by-passed credit after successful completion of all undergraduate course requirements. This is in accordance with the current University policy for by-passed credit. Upon successful completion of all program requirements, the student will receive the B.S.N. and M.S.N. degrees.

• **R.N.-M.S.N. Bridge Courses:**

8200:225	Health Assessment	3
8200:435	Nursing Research	3
8200:460	Issues and Roles of the Profession of Nursing	3
8200:465	Concepts and Theories of Professional Nursing	3
8200:470	Community Health Nursing	4
8200:485	Leadership Roles of Professional Nursing	5

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 Sciences 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 Maurice Morton 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 and technology 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.

ADMISSION REQUIREMENTS

Admissions to the graduate program in the college are competitive. The departmental admission committees carefully consider each applicant. Early application is suggested.

DEPARTMENT OF POLYMER SCIENCE

Students with an undergraduate degree in chemistry, physics, or engineering and a grade point average of 2.75/4.0 or better are admissible. Students holding a degree in biology or natural sciences usually need additional courses on the undergraduate level in physics, physical and analytical chemistry. For such students, a special non-degree admission may be given for one or two semesters, followed by a full admission upon a student's successful completion of the remedial undergraduate courses. All applications must be supported by at least one letter of recommendation from a teacher or supervisor that the candidate is able to handle independent scientific research. GRE scores are recommended with each application.

A student with a M.S. in the sciences from another university can be admitted to the Ph.D. program. Two letters of recommendation are required in such cases to be certain that the student is likely to be successful in doctoral research.

DEPARTMENT OF POLYMER ENGINEERING

Students with an undergraduate degree in Chemical Engineering, Mechanical Engineering or related degrees with a grade point average of 2.75/4.0 or better are admissible. Students holding a degree in the natural sciences usually need additional undergraduate engineering courses, which are required prerequisites for core courses. For such students, depending upon their background, a special non-degree admission may be given followed by full admission upon successful completion of a series of required remedial courses.

A student with a M.S. in Mechanical or Chemical Engineering from another university can be admitted to the Ph.D. program. Two letters of recommendation are required in such cases to be certain that the student is likely to be successful in doctoral research.

DOCTOR OF PHILOSOPHY

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 dissertation 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, 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 18 credits of graduate course work and all dissertation credits must be completed at the University.

There is a university minimum residence time requiring one year, although graduate students starting with a B.S. or B.A. typically spend 4 years in residence.

- Completion of 18 credits among the following core courses (2 credits each) in polymer science:

4 credits of polymer chemistry courses:

9871:601	Polymer Concepts
9871:602	Synthesis and Chemical Behavior of Polymers
9871:704	Condensation Polymerization
9871:705	Free Radical Reactions in Polymer Science
9871:706	Ionic and Monomer Insertion Reactions

4 credits of polymer physical chemistry courses:

9871:674	Polymer Structure and Characterization
9871:675	Polymer Thermodynamics

4 credits of polymer physical property courses:

9871:631	Physical Properties of Polymers I
9871:632	Physical Properties of Polymers II

4 credits of polymer engineering and technology courses:

9871:701	Polymer Technology I
9871:702	Polymer Technology II
9871:703	Polymer Technology III

3 credits of polymer science laboratory:

9871:613	Polymer Science Laboratory
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- Completion of 18 credits of elective courses appropriate to each student's area of interest.
- Pass eight cumulative examinations which are given at monthly 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.
- 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.

- Present a public/departmental seminar on the completed research.
- 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 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 11 of credits in the following required core courses in polymer science: 9871:601 Polymer Concepts; 613 Polymer Science Laboratory; 631 Physical Properties of Polymers I; 674 Polymer Structure and Characterization; 701 Polymer Technology.

Completion of 13 credit hours of elective courses appropriate to each student's area of interest.

- Completion of a research project (9871:699) and the resulting 6 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.
- Demonstrated competence in computer skills.
- At least 12 credits of graduate coursework and all theses credits must be completed at the University.

Master of Science in Engineering (Polymer Engineering Specialization)

The major emphases of the graduate program in polymer engineering are in polymer processing, engineering performance and structural and rheological characterization of polymers.

The academic program requires the completion of 33 credits: 12 credits of core courses, 3 credits of approved mathematics courses, 6 thesis credits, and 12 credits of approved electives.

- 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
	Total	12

- 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 3 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	3
9871:674	Polymer Structure and Characterization	2
9871:675	Polymer Thermodynamics	2

- Thesis:

9841:699	Master's Thesis	6
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- Requirements:

Polymer Engineering Core	12
Approved Electives	12
Approved Mathematics	3
Thesis	6
Total	33

- Attendance at and participation in department seminars as directed by the advisory committee is required.

Interdisciplinary and Certificate Programs of Study

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 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

John C. Green, Ph.D., *Director*

The Ray C. Bliss Institute and the Department of Political Science have combined to offer a Certificate Program in Applied Politics for graduate students.

The Certificate Program in Applied Politics offers course work in the history, organization and management of campaigns intended to influence the outcome of political decisions. Working from a set of core courses, students are allowed to concentrate in the area of applied politics of greatest interest—campaigns, communications, lobbying, political parties, etc. Believing that democracy is best served by having active and informed citizens, the certificate is designed for all students, no matter what their degree program as long as they have a deep interest in practical politics.

Requirements

Persons are eligible for admission to the Certificate Program in Applied Politics if they have been admitted to study as full-time students, special, or non-degree 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 chair/director of the department/school in which they are enrolled. Students shall seek admission to this program by filing an application with the Bliss Institute. The student shall schedule courses with the assistance of an advisor at the earliest possible time.

Core Courses (required—12 credits):

3700:570	Campaign Management I	3
3700:571	Campaign Management II	3
3700:672	Seminar: Political Influence and Organizations	3
3700:695	Internship in Government and Politics	3

Electives:

Six credits selected from the following (at least 3 credits must be from 3700:502, 540, 572, 573, 574, 575, 576, or 630):

3700:502	Politics and the Media	3
3700:540	Survey Research Methods	3
3700:572	Campaign Finance	3
3700:573	Voter Contact and Elections	3
3700:574	Political Opinion, Behavior and Electoral Policies	3
3700:575	American Interest Groups	3
3700:576	American Political Parties	3
3700:630	Seminar in National Politics	3
7600:691	Adv. Communication Studies: Communication in Political Campaigns	3

Additional 3 credits from above or from approved courses from Political Science, Communication or other departments. Students must maintain at least a 3.0 average in their course work for the certificate.

Certificate

Political science majors will, upon completion of the program, be awarded an M.A. degree in Political Science with a Certificate in Applied Politics. Majors in other disciplines will have the Certificate noted on their permanent record.

COMPOSITION

Martin McKoski, Ph.D., *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

Helen Cleminshaw, Ph.D., *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
7400:540	Family Crisis	3
7400:590	Family and Divorce	2
7400:602	Family in Life Span Perspective	2
9200:684	Alternate Dispute Resolution	3

GERONTOLOGY

Harvey Sterns, Ph.D., *Director*
 Isadore Newman, Ph.D., *Associate Director*
 Raymond E. Sanders, Ph.D., *Associate Director of Research*
 Evelyn Sutton, M.S., *Program Coordinator, Gerontology*
 Jerome Kaplan, Ph.D., *Program Coordinator, Nursing Home Administrator Program*

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 help 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 at the graduate level, a student should:

- Be formally admitted to The University of Akron Graduate School.
- 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:

3006:680	Interdisciplinary Seminar in Life-Span Development and Gerontology	3
3006:695	Practicum/Internship	3
—	Research Methods Course	3*

Electives:**

3006:686	Retirement Specialist	2
3006:690	Workshop – Women: Middle and Later Years	2
3006:690	Workshop – Aging: Process and Intervention	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
	or	
6500:683	Health Services Systems Management (with permission)	3
7400:603	Family Relationships in Middle and Later Years	3
7400:550	Social Needs and Services for Later Adulthood and Aging	3

*From student's home department

**Select a minimum of three courses. 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.

***Offered every other year.

HIGHER EDUCATION

Dianne Brown-Wright, Ph.D., *Coordinator*

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 for 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 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 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	Advanced Principles of Educational Administration (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

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)	3
	or	
5700:609	Principles of Curriculum Development (B)	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.

HOME-BASED INTERVENTION THERAPY

Helen K. Cleminshaw, Ph.D., *Coordinator*

Program

This certificate program is a special course of study along with undergraduate and graduate degree programs in various departments and colleges throughout the University. Undergraduate students will earn the certificate upon graduation in their degree program. Individuals who already hold undergraduate or graduate degrees may also pursue the certificate. Students with an undergraduate degree who do not seek a graduate degree may pursue the certificate in the postbaccalaureate program. Students who already hold a graduate degree may be admitted to the program as non-degree graduate students. Students pursuing graduate degrees will receive their graduate certificate upon completion of the requirements for their graduate degree. The program represents a concentration in current theoretical knowledge and practice in home-based intervention. It adds another dimension to the knowledge and skills a student is able to offer in the many professions that relate to services to at-risk children and their families. This course of study coordinates multidisciplinary training of personnel in home-based intervention and helps to meet the need for trained professionals in home-based intervention.

The undergraduate and graduate curriculum committees of the Center for Family Studies will oversee the certificate program and certify through the Director of the Certificate Programs in Home-Based Intervention that all requirements for the certificate have been completed.

Admission

To participate in the program at the graduate level, the student should:

- Be formally admitted to The University of Akron Graduate School.
- Make written application to the program countersigned by student's major academic adviser (if applicable).
- Have an interview with the Director of the Certificate Programs in Home-Based Intervention.
- Receive written notification for admission from the Director of the Certificate Programs in Home-Based Intervention.
- Consult with the Director of the Certificate Programs in Home-Based Intervention to formulate a program of study.

All students enrolled in the home-based certificate programs will enroll in the core course in Home-Based Intervention. Students enrolled in the undergraduate and postbaccalaureate program will enroll in the courses at the undergraduate level. Students admitted to the Graduate School as degree seeking or non-degree students will enroll in graduate courses. Graduate students enrolled in the core courses at the 500 level will have an additional graduate level project.

Students will complete a minimum of 18 hours of graduate credits in core and elective coursework. In order to earn the interdisciplinary certificate in Home-Based Intervention, the student must complete the following requirements within six years after beginning the program.

Requirements

Core Courses:

1820:503	Home-based Intervention Theory	3
1820:504	Home-based Intervention Techniques and Practice	3
1820:505	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 follows:

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	3
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 (9 credits):

Select one course from three different disciplines. (Must be outside student's major degree area)

Specific Skill Areas:

• Psychology		
3750:530	Psychological Disorders of Children	4
3750:704	Theories of Personality	3
• Sociology		
3850:550	Sociology of Mental Health	3
3850:688	Human Ecology	3
3850:753	Family and Health (Special Topics)	1-3
• 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
• 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
• Multicultural Education		
5630:582	Characteristics of Culturally Different Youth	3

• 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	Parent Education	3
7400:675	Conceptual Frameworks in Family Ecology	3
• Social Work		
7750:510	Minority Issues in Social Work Practice	3
7750:551	Social Work and Child Welfare	3
7750:552	Social Work and Mental Health	3
7750:554	Social Work in Juvenile Justice	3

MID-CAREERS PROGRAM IN URBAN STUDIES

Gary M. Gappert, Ph.D., *Director*

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 Public Administration and 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:

Geography/Urban Planning

3350:630	Introduction to Planning Theory	3
3350:600,1,2	Seminar: Urban Planning Design	3
3350:600,1,2	Seminar: Planning Theory and Innovation	3
	Elective(s)	4

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 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

Stephen C. Brooks, Ph.D., *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 chair 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 (choose one)

3250:530	Human Resource Policy	3
3250:606	Public Finance	3
3250:665	Seminar on Economic Planning	3

• Political Science (choose one)

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 (choose one)

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.

TEACHING ENGLISH AS A SECOND LANGUAGE†

Kenneth J. Pakenham, Ph.D., *Director*

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

3300:573	Seminar in Teaching ESL: Theory and Method	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**	
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.

TECHNICAL AND SKILLS TRAINING

This certificate program in technical and skills training is a special course of study within the College of Education undergraduate and graduate programs to serve the practicing or prospective business and/or industrial-technical trainer.

Persons are eligible for admission to the Certificate in Technical and Skills Training if they have been admitted to study as special, non-degree or full-time students in any department of the University. Undergraduates students will earn the certificate upon graduation from their degree program. Individuals who already hold undergraduate or graduate degrees may also pursue this certificate. Students with an undergraduate degree who do not seek a graduate degree may pursue the certificate at the postbaccalaureate program. Students who already hold a graduate degree or do not wish to pursue a graduate degree may be admitted to the program as a non-degree graduate student. Students pursuing graduate degrees will receive their graduate certificate upon completion of the requirements for their graduate degree. Students enrolled in the undergraduate and post-baccalaureate program will enroll in the courses at the undergraduate level. Students admitted to the Graduate School as degree seeking or non-degree students will enroll in graduate courses. Graduate students enrolled in the core courses at the 500 level will have an additional graduate level project.

Those formally admitted to The University of Akron and meeting the Certificate entrance requirements may pursue the Certificate in Technical and Skills Training. Students shall seek admission to this program by filing an application with the program coordinator. The student will schedule courses with the assistance of an adviser in the Technical Education Program.

Those who have completed either a BS or MS in Technical Education at The University of Akron prior to the Fall of 1994 must seek adviser approval before pursuing the Certificate. Only six hours of prior technical education coursework can be accepted towards the certificate and all accepted coursework must be no older than six years at the time of completion of the certificate. Only graduate credit may be used for a graduate certificate and only undergraduate credit may be used for an undergraduate or postbaccalaureate certificate. Any course substitutions must be made with the adviser's prior written approval. Students must maintain at least a 3.0 average in certificate coursework to receive this certificate. Enrollment will be limited to space available. All those applying for the undergraduate certificate, must have completed at least 60 semester hours with a 2.75 GPA. For those applying for the graduate certificate, students must have a 2.75 GPA in their completed undergraduate degree. All coursework must be completed within six years.

Admission

To participate in the program the student should:

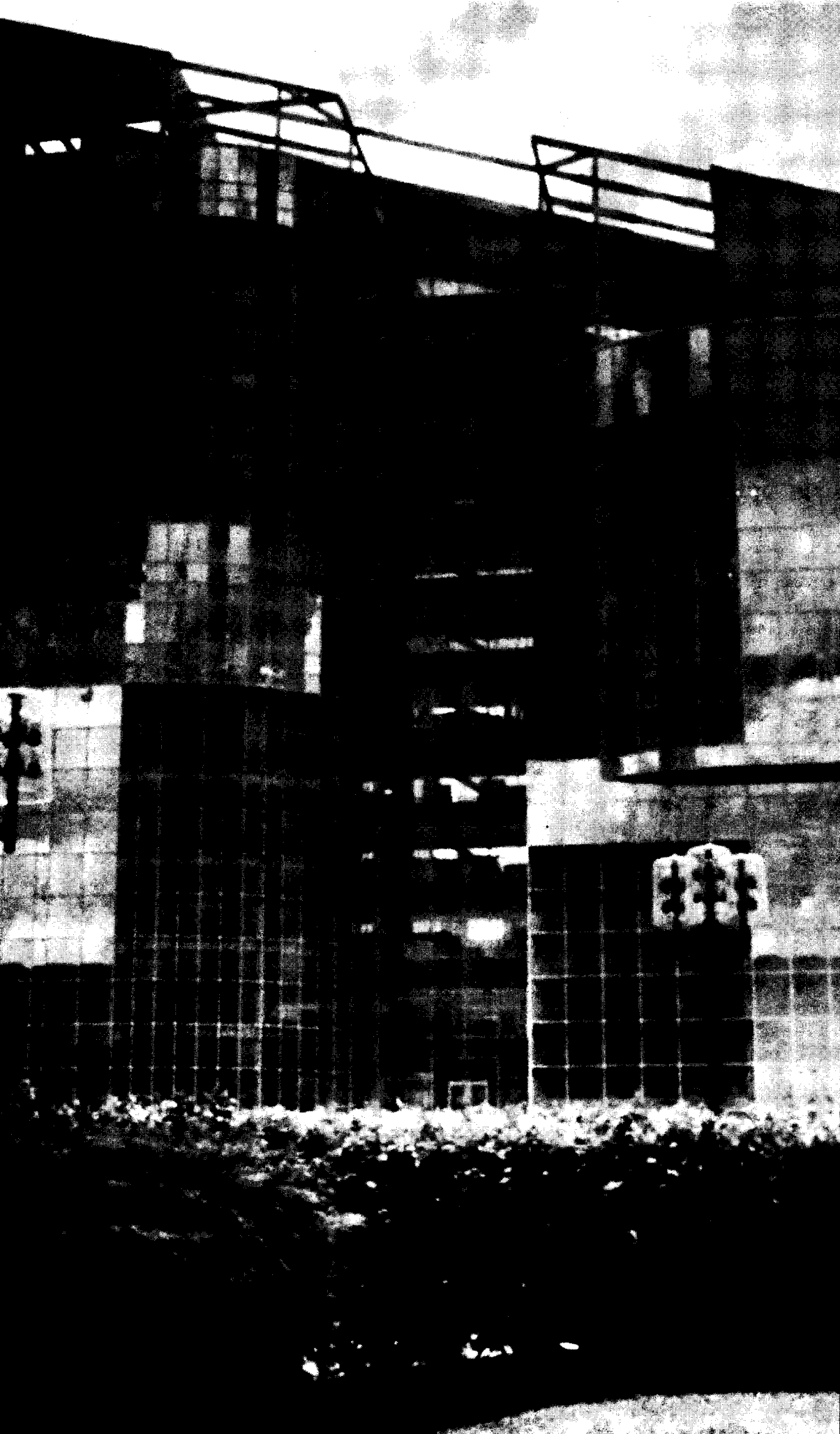
- Be formally admitted to The University of Akron as an undergraduate, postbaccalaureate or graduate student.
- Make written application to the program coordinator.
- Receive written notification from the program coordinator.
- Consult with a Technical Education Program Advisor to formulate a program of study.

Requirements

Minimum: 18 Credits

5400:500	The Postsecondary Learner	3
5400:515	Training in Business and Industry	3
5400:530	Curriculum Development in Technical Education	2
5400:531	Curriculum Development for Technical Education Lab	1
5400:535	Instructional Techniques in Technical Education	4
5400:691	Internship: Teaching Technical Education	2
5100:520	Introduction to Computer-Based Education	3

The Internship is the last course taken. This course can not be taken until all other certificate courses have been completed with a 3.0 GPA or better. 5400:531 and 5400:530 must be taken together and before 5400:535.



5

Research
centers
and
institutes

Research Centers and Institutes

University Research Council:

Nicholas Sylvester, Ph.D., *Vice President for Research and University Development* (chair)

—, *Associate Vice President for Research* (member)

Frank Kelley, Ph.D., *Dean College of Polymer Science and Polymer Engineering* (member)

Randy Moore, Ph.D., *Dean, Buchtel College of Arts and Sciences* (member)

Irving Miller, Ph.D., *Dean, College of Engineering* (member)

Charles Dye, Ph.D., *Dean, Graduate School* (member)

Charmaine Streharsky, Ed.D., *Director of Research Services and Sponsored Programs* (member and secretary)

Ted Mallo, J.D., *Assistant Professor, General Counsel* (member, *ex-officio*)

Virginia Gunn, Ph.D., *Faculty Senate Nominee* (member)

Antonia Forster, Ph.D., *Faculty Senate Nominee* (member)

James White, Ph.D., *Institute of Polymer Engineering* (member)

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. 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 Associate Vice President for Research and the Director of Research Services and Sponsored Programs. The University Research Council is responsible for encouraging, supporting, and making recommendations pertaining to sponsored and contractual research carried out at the University's departments, centers, and institutes. The Council consists of the Vice President for Research and University Development, the Associate Vice President for Research, 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, Ray C. Bliss, are: to give all citizens, and particularly students, 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; and to improve understanding of continuity and change in American political institutions.

Institute for Biomedical Engineering Research

Stanley Rittgers, 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 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 Olson Research Center at 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 clearing house 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

Annabelle M. Foos, Ph.D., *Interim 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*

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 5 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.

The Center offers certificates in the following specialty areas: Divorce Mediation and Home-Based Intervention. Please refer to the sections on Certificate Programs in this *Bulletin* or the *Undergraduate Bulletin* for further information.

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.

Fisher Institute for Professional Selling

Jon M. Hawes, Ph.D., *Director*
James T. Strong, Ph.D., *Associate Director*

The Fisher Institute for Professional Selling was founded in 1993. Its mission is to enhance the image of the sales profession, to promote professional selling and sales management as a rewarding lifetime career, to provide quality sales training and learning experiences, and to advance the knowledge of professional selling through the support of applied research.

Institute for Futures Studies

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.

Initiated In 1987, The Ohio Policy Issues Network (OPIN) continues to research and analyze emerging policy issues in the state of Ohio and beyond. In addition, in 1990, the OPIN began to provide and disseminate viable options to a diverse range of policy problems. The bimonthly publications of the Ohio Policy Issues Network are the *OPIN Policy Book*, *Ohio Foresight* and the *Issues Analysis Report*.

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 European 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 Public Administration and Urban Studies and The Center for Urban Studies, the Institute has organized and produced several books relating to the urban future including the 1990 publication, *Cities in a Global Society* and the forthcoming *The Future of Urban Environments*. It has also sponsored major conferences on George Orwell, Aldous Huxley, and Edward Bellamy 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*
Raymond E. Sanders, Ph.D., *Associate Director for Research*
Evelyn Sutton, M.A., *Program Coordinator, Gerontology Certificate Program*
Jerome Kaplan, Ph.D., *Program Coordinator, Nursing Home Administrator Program*

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 23 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.

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 Medicines; Gerontology Center, Kent State University; and Gerontology Committee, Youngstown State University.

Center for Nursing

Elizabeth Kinion, Ed.D., *Director*

The Center for Nursing is a part of The University of Akron's College of Nursing. It is an education and practice center for College of Nursing faculty and students as well as faculty and students from other health care disciplines on campus.

Since 1981 the Center for Nursing has provided wellness services to campus students, faculty and staff as well as outreach services to community residents of all ages. Services include health assessments and nursing physicals, stress management and self-care assistance, family and group education and support sessions. Community outreach to vulnerable populations is a major emphasis of the center.

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.

Joint Center for Policy Research

Shara L. Davis, M.A., *Director*
James L. Shanahan, Ph.D., *Director, Center for Urban Studies*

Designed as a partnership between The University of Akron's Center for Urban Studies (CUS) and Lorain County Community College's Public Services Institute, the Joint Center for Policy Research (JCPR) combines the energies of research faculty, staff and graduate students of a state university with the strong commitment of a community college in responding to local needs.

The Joint Center's primary mission is to serve the Lorain County community-leaders, nonprofit organizations, government agencies, and citizens-and to extend the college's commitment to local economic development. In addition, its services are provided on a regional level.

In its fourth year of operation, the services being offered upon request are: Customized Policy Research and Consultation; Data Service Delivery System; and Capacity Building. Customized policy research and consultation services involve the collection of qualitative and quantitative information utilizing various data gathering techniques, primarily survey research and focus group techniques. The data service delivery system involves the sharing of information from sources including the 1990 Census data as well as data from other JCPR and CUS research endeavors. Capacity building involves training and empowering organizations with the ability to facilitate their own qualitative information collection and to use that information through the decision making process. The Joint Center carries out its projects by drawing upon the full services of the CUS Research Lab.

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 characterizations.

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.

The Maurice Morton Institute of Polymer Science

Frank Harris, Ph.D., *Director*

The institute is concerned with basic and applied research in polymers. It was established in 1956 as the 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 enhancing cooperation between the University and industries. Great opportunities are available for both graduate and undergraduate students to conduct practical research.

Small Business Institute

Jeffrey C. Dilts, 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.

Survey Research Center

Jesse F. Marquette, Ph.D., *Director*

Anne-Marie Scarisbrick-Hauser, Ph.D., *Associate Director*

The University of Akron Survey Research Center is a research organization established with the prime objective of making quality survey research facilities available to university personnel, national state, community and other legitimate research agencies. The Center is equipped to facilitate telephone interviewing, mail surveys, focus group administration, intercept studies and personal interviews, database analysis, and computer assisted data entry and multiple method studies. Center staff are available for consultation in the development of grant proposals and budgets.

The Survey Research Center has been in continuous operation at The University of Akron since 1982, utilizing research and professional staff, graduate assistants, and over 50 regular interviewers. Most of the work done by the Center is on behalf of the government or non-profit agencies and mass media organizations such as newspapers and television stations. The Center's work, both directly and indirectly, influences public discussion and planning on significant social and political issues. The Survey Research Center has, since its inception processed more than 98,000 completed interviews in over 100 projects concerned with topics such as national or state political and social issues, government services, economic development, and public policy planning.

Center for Urban Studies

James L. Shanahan, Ph.D., *Director*

The Center for Urban Studies (CUS) is The University of Akron's oldest policy research and professional service unit. Established in 1965, the Center acts as a bridge between the University and the Akron community, Ohio and beyond in pursuit of the University's urban mission. To meet the needs of urban communities the Center engages in a wide variety of scholarly and applied research projects, research consultation, and information and data services.

Using the talents of faculty, researchers, support staff, and students, the Center explores important economic, social, and political issues; works with others to reach a better understanding of these issues; and assists groups and organizations actively engaged in problem solving, coalition building, or strategic planning.

Since 1979, the Center has been the University's representative to the Ohio Board of Regent's Urban University Program (UUP) which links eight state universities to help Ohio meet the challenges of its urban future. UUP's Northeast Ohio Inter-Institutional Research Consortium focuses on the revitalization of the region through the efforts of the faculty and staff of the four urban universities in Northeast Ohio.

Over the years, the Center has expanded its programs and services, building a substantial intellectual and technological infrastructure. The majority of the Center's research and services is supported by external grants and contracts which represent UUP funding for multiyear projects, multicampus projects, and faculty research projects as well as funding from private sources for client-driven research and services.

CUS activities are organized under three broad programs: Public Policy Issues Program; Public Sector Marketing Research and Data/GIS Services Program; and Community Institution and Leadership Building Program. Increasingly, these areas are becoming distinct programs, each with its own program head, professional staff, and affiliated faculty from various disciplines and professions.

This multidisciplinary approach encourages faculty and graduate student participation from all departments with an urban focus. A part of the Buchtel College of Arts and Sciences, the Center for Urban Studies provides the setting and facilities through which interested faculty and graduate students do become involved in urban research or professional service activities in 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 participation.

Linked with CUS is another important center: the Joint Center for Policy Research, an innovative partnership with the Public Services Institute at Lorain County Community College which is intended to serve the needs of Lorain County for policy research services.



6

Courses
of
instruction

Course Numbering System*

INDEX

Interdisciplinary Programs

- 1800 Divorce Mediation
1820 Home-Based Intervention Therapy
1880 Medical Studies

Buchtel College of Arts and Sciences

- | | |
|---|--|
| 3001 Women's Studies | 3460 Computer Science |
| 3006 Institute for Lifespan Development and Gerontology | 3470 Statistics |
| 3010 Environmental Studies | 3490 Engineering Applied Mathematics |
| 3100 Biology | 3500 Modern Languages |
| 3110 Biology/NEOUCOM | 3520 French |
| 3150 Chemistry | 3530 German |
| 3200 Classics | 3580 Spanish |
| 3210 Greek | 3600 Philosophy |
| 3220 Latin | 3650 Physics |
| 3250 Economics | 3700 Political Science |
| 3300 English | 3750 Psychology |
| 3350 Geography and Planning | 3850 Sociology |
| 3370 Geology | 3870 Anthropology |
| 3400 History | 3980 Public Administration and Urban Studies |
| 3450 Mathematics | |

College of Engineering

- | | |
|-----------------------------|-----------------------------------|
| 4200 Chemical Engineering | 4450 Engineering Computer Science |
| 4300 Civil Engineering | 4600 Mechanical Engineering |
| 4400 Electrical Engineering | 4800 Biomedical Engineering |

College of Education

- | | |
|--|---|
| 5100 Educational Foundations | 5610 Special Education |
| 5200 Elementary Education | 5620 School Psychology |
| 5250 Reading | 5630 Multicultural Education |
| 5300 Secondary Education | 5700 Educational Foundations and Leadership |
| 5400 Technical and Vocational Education | 5800 Special Educational Programs |
| 5550 Physical Education | 5900 Higher Education Administration |
| 5560 Outdoor Education | |
| 5600 Educational Guidance and Counseling | |

College of Business Administration

- | | |
|------------------|-----------------------------|
| 6200 Accountancy | 6600 Marketing |
| 6400 Finance | 6700 Professional |
| 6500 Management | 6800 International Business |

College of Fine and Applied Arts

- | | |
|--|------------------------------|
| 7100 Art | 7700 Communicative Disorders |
| 7400 Home Economics and Family Ecology | 7750 Social Work |
| 7500 Music | 7800 Theatre |
| 7510 Musical Organizations | 7810 Theatre Organizations |
| 7520 Applied Music | 7900 Dance |
| 7600 Communication | 7910 Dance Organizations |
| | 7920 Dance Performance |

College of Nursing

- 8200 Nursing

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 **Section One**, "Course Numbering System," 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:

- 503 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.
- 504 HOME-BASED INTERVENTION TECHNIQUES AND PRACTICE** *3 credits*
Prerequisite: 503. Provides intervention techniques and skill areas required for home-based intervention and learning opportunities for matching techniques with specific family problems.
- 505 HOME-BASED INTERVENTION INTERNSHIP** *3-5 credits*
Prerequisite: 504. 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.

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 services.

WOMEN'S STUDIES

3001:

- 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

3006:

- 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.

ENVIRONMENTAL STUDIES

3010:

- 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.

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
Prerequisite: 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*** 4 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. 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
Prerequisite: 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
Prerequisite: 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.
- 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
Prerequisite: 112, 217. Structure, physiology, life cycles, economic importance 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 a 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 VERTEBRATE EMBRYOLOGY** 4 credits
Prerequisite: 112 or permission of instructor. Designed to introduce the process of vertebrate development. Lecture and lab work include descriptive and experimental embryology.
- 567 COMPARATIVE VERTEBRATE MORPHOLOGY** 4 credits
Prerequisite: 112 or permission of instructor. An introduction to the comparative morphology of major vertebrates. The laboratory consists of dissections of representative vertebrates.
- 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.
- 625 PROCARYOTIC DNA TECHNIQUES** 4 credits
Prerequisite: permission. Basic DNA techniques involving prokaryotic microorganisms including extraction of DNA, cleavage of DNA and cloning. Laboratory.
- 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.
- 650 EUKARYOTIC GENE EXPRESSION** 3 credits
A lecture course exploring the basic principles, methods and applications of molecular biology to a wide range of scientific disciplines.
- 660 ENVIRONMENTAL PHYSIOLOGY** 3 credits
Prerequisites: 561, 562. Study of physiological reactions of healthy mammals to natural changes or extremes of physical environment.
- 670 MEDICAL PHYSIOLOGY, PATHOPHYSIOLOGY, AND PHARMACOLOGY** 3 credits
Prerequisite: Admission to M.S.N. program, or 3100/561, or consent of instructor. Selected principles of human physiology, pathophysiology, and pharmacology are examined in depth, interrogated, and related to the care of patients in the clinical setting.
- 681 CYTOLOGY** 3 credits
Prerequisite: 311. Structure and functional organization of cells at ultrastructural level. Three lecture hours a week.
- 682 EUKARYOTIC TECHNIQUES-DNA** 3 credits
A graduate level laboratory course which familiarizes the student with several methods used to isolate and characterize eucaryotic genes at the DNA level.
- 684 EUKARYOTIC TECHNIQUES-RNA** 3 credits
A graduate level laboratory course which familiarizes the student with several methods used to study eucaryotic genes at the RNA level.
- 685 ANIMAL CELL CULTURE** 4 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.

*Field trips involved; minor transportation costs.

- 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.
- 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 THESIS** 1-6 credits
(May be repeated) A minimum of six credits is required for thesis option student.

BIOLOGY/NEOUCOM 3110:

- 620 MICROSCOPIC ANATOMY** 5 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 I** 3 credits
Prerequisites: graduate standing and permission. An intensive survey of human macromorphology.
- 631 HUMAN GROSS ANATOMY II** 3 credits
Prerequisite: graduate standing and permission. 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** 3 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.
- 695 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.
- 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.
- 640.5 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.
- 611 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.
- 619 TRANSITION-METAL ORGANOMETALLICS** 3 credits
Prerequisite: 472 or equivalent. The organometallic chemistry of the transition metal elements. Topics covered include synthesis, characterization methods, structure, bonding, reactivity, and application.
- 620 MAIN GROUP ORGANOMETALLICS** 3 credits
Prerequisite: 472 or equivalent. The organometallic chemistry of main group elements. Topics covered include synthesis, characterization methods, structure, bonding, reactivity, and applications.
- 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 PHYSICAL INORGANIC CHEMISTRY** 3 credits
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.

- 630 THEORETICAL INORGANIC CHEMISTRY** 2 credits
Prerequisite: 314, 472, 629, or permission. Detailed treatment of chemistry of transition elements. Group theoretical applications, ligand field theory, kinetics and mechanism, 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.
- 639 DESCRIPTIVE INORGANIC CHEMISTRY** 3 credits
Prerequisite: Undergraduate inorganic chemistry. The synthesis, characterization, structure, bonding, and reactivity of inorganic compounds. Emphasis is placed on applications and on examples from the recent literature.
- 640 X-RAY CRYSTALLOGRAPHY** 3 credits
Prerequisite: permission. The theoretical and practical aspects of single crystal x-ray crystallography are discussed. Topics covered include diffraction, space groups, structure solution and refinement.
- 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 THESIS** 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 DISSERTATION** 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: 200 and 201, or 244, 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
Prerequisite: 200 and 201, or 244. Basic problems in economic development. Theories of development. Government planning for development. Trade and development of underdeveloped countries. Credit not available for students with credit for 3250.664.

575 DEVELOPMENT OF ECONOMIC THOUGHT 3 credits
Prerequisites: 200 and 201, or 244. 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 and 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 statistics with only relatively brief mention of dynamic models.

603 MACROECONOMIC ANALYSIS II 3 credits
Prerequisite: 602. Macrodynamics economics 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 and methods of analysis of policy issues. Covers non-econometric methods, e.g., project analysis, mathematical programming, social accounting. Stresses applied problem solving and effective communication.

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 MASTER'S 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.
- 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, or 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'Neil, 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 Completion of 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.
- 583 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.
- 589 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 Lily, Greene, Marlowe, Jonson, Beaumont, Fletcher, Webster, Middleton and Ford and in contemporary writings relevant to theory and practice of drama.
- 618 MILTON** 3 credits
Emphasis on Milton's major poems and prose works: *Paradise Lost*, *Paradise Regained*, *Areopagitica*. Student becomes acquainted with Milton the man and Milton the artist.
- 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 relationship 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 MASTER'S THESIS** 1-6 credits
Original work in the field of literature and language and completion of graduate student's required thesis.

GEOGRAPHY AND PLANNING

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 INTRODUCTION TO 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.
- 539 DEVELOPMENT OF AMERICAN PLANNING** 3 credits
Prerequisites: 533 or permission. Explores the growth of urban and regional planning theory and practice and the development of a planning profession, particularly in the twentieth century.
- 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** 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 resource 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, sub-urbanization 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.
- 630 INTRODUCTION TO PLANNING THEORY** 3 credits
Introduction to the political, institutional and ethical foundations and procedural theories of urban and regional 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 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.
- 637 METHODS OF PLANNING ANALYSIS I** 3 credits
Prerequisite: 630. Introduction to the primary analytic techniques for small-area demographic and economic analysis and projection.
- 638 METHODS OF PLANNING ANALYSIS II** 3 credits
Prerequisite: 630. Review of the primary techniques for comprehensive plan preparation, evaluation and implementation.
- 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 INTERNSHIP** 3 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 MASTER'S THESIS** 2 credits
(May be repeated twice) Prerequisite: permission of department head. Supervised original research.

GEOLOGY

3370:

- 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 MINERALOGY-INTRODUCTORY PETROGRAPHY** 3 credits
Prerequisites: 230 and 231 or equivalent. Optical techniques for identification, characterization, and classification of minerals and rocks using the petrography microscope. Laboratory.
- 533 ADVANCED PETROGRAPHY** 3 credits
Prerequisite: 532. Petrogenesis of igneous, metamorphic and sedimentary rocks as determined by microscopic studies of textures and mineral assemblages using 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.
- 549 BOREHOLE GEOPHYSICS** 3 credits
Prerequisite: 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.
- 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.
- 593 GEOLOGY FIELD CAMP I** 3 credits
Prerequisites: 101 and 102 and permission of instructor. Introduction to collection and interpretation of field data and construction of geological maps.
- 594 GEOLOGY FIELD CAMP II** 3 credits
Prerequisites: 231, 350, 493/593 or permission of instructor. Advanced techniques and methods of field geology necessary for detailed geological maps and interpretation.
- 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 studies. 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.
- 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.
- 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 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 MASTER'S THESIS** 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** 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.
- 501 IMPERIALISM IN EAST ASIA** 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.
- 516 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.
- 524 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.
- 525 THE REFORMATION** 3 credits
Europe in 16th Century; its religious, cultural, political and diplomatic development, with special emphasis on Protestant, Anglican and Catholic reformations.
- 529 EUROPE IN THE FRENCH REVOLUTIONARY ERA, 1789-1815** 3 credits
Development of Revolution; Napoleon's regime and satellites.
- 538 NAZI GERMANY** 3 credits
This course covers the social, economic, and political history of Germany from World War I to 1945 with emphasis on the Third Reich.
- 539 EUROPE IN THE COLD WAR** 3 credits
Prerequisites: 6 hours of 3400 courses at the 200 or 300 level, or permission of the instructor. The political, social and cultural history of Europe from the end of the Second World War to the Revolutions of 1989.
- 540 TUDOR AND STUART ENGLAND, 1485-1714** 3 credits
Emphasis on social, economic and cultural topics, including literature, art and architecture.
- 543 CHURCHILL'S ENGLAND** 3 credits
An examination of the changes that Britain experienced during the life of Winston Churchill, 1874-1965. Emphasis is on cultural, social, and political developments.
- 550 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.
- 551 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.
- 552 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.
- 553 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.
- 554 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.
- 555 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.
- 556 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.

- 557 RECENT AMERICA: THE UNITED STATES SINCE 1945** 3 credits
Nuclear age, cold war, foreign policy and domestic affairs to present. Social, political, constitutional, diplomatic, cultural and economic changes since 1945.
- 560 UNITED STATES DIPLOMACY TO 1919** 3 credits
Establishment of basic policies, diplomacy of expansion and emergence of a world power.
- 561 UNITED STATES DIPLOMACY SINCE 1914** 3 credits
Responses of government and public to challenges of war, peace making and power politics.
- 564 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.
- 565 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.
- 566 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.
- 567 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.
- 570 OHIO HISTORY** 3 credits
Political, social, economic and intellectual history of Ohio, with special emphasis on Ohio's relationship to Old Northwest and to the nation.
- 571 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.
- 572 LATIN AMERICA: ORIGINS OF NATIONALITY** 3 credits
Pre-Columbian civilization, discovery and conquests; colonialism, struggle for independence and formation of new societies.
- 573 LATIN AMERICA: THE TWENTIETH CENTURY** 3 credits
Social revolution, political ideology and contemporary problems.
- 575 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.
- 576 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.
- 581 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.
- 582 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.
- 584 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.
- 585 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.
- 586 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.
- 587 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.
- 588 WESTERN TECHNOLOGY** 3 credits
Technology in Mesopotamia, Egypt, Greece, Rome, Islam, medieval Europe; first and second industrial revolutions in Europe, America.
- 593 SPECIAL STUDIES IN HISTORY** 3 credits
Includes experimental and interdisciplinary studies, as well as those subjects that are not listed in this *Graduate Bulletin*. See departmental office for information on particular offerings.
- 594 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 Europe 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 1877** 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 1877** 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 1877** 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 1877** 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.
- 697,8 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 MASTER'S THESIS** 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 DOCTORAL DISSERTATION** 1-12 credits
Prerequisite: 898. Writing of Doctor of Philosophy degree dissertation.

MATHEMATICS

3450:

- 501 HISTORY OF MATHEMATICS** 3 credits
Prerequisite: 222. Origin and development of mathematical ideas. Course does not meet degree requirements in the department.
- 510 ADVANCED LINEAR ALGEBRA** 3 credits
Prerequisite: 317. 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 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 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: 235 or 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 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.
- 538,9 ADVANCED ENGINEERING MATHEMATICS I AND II** 3 credits
Prerequisites: 235 and 312 or permission. Sequential. Matrices, eigenvalue problems, systems of ODEs, vector analysis, complex variables, special functions, Fourier series and transforms, and PDEs.
- 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 coordinate, 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, mapping, 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.
- 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: semi-groups, 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 integral, convergence theorems, L_p -spaces, Radon-Nikodym theorem.
- 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.
- 629,30 MATRIX COMPUTATIONS I AND II** 3 credits each
Prerequisite: 422/522 or permission. Sequential. This course is a treatment of numerical linear algebra based on the principles of scientific computing.
- 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 advisor. Seminar-type discussion on topics in mathematics leading to supervised research project. No more than 2 credits apply to major requirements.
- 682 SEMINAR IN MATHEMATICS** 1-3 credits
(May be repeated) Prerequisite: permission of advisor. Seminar-type discussion on topics in mathematics leading to supervised research project. No more than 2 credits apply to major requirements.
- 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.
- 698 MASTER'S RESEARCH** 1-6 credits
(May be repeated) Prerequisite: permission of advisor. Research in suitable topics in mathematics or applied mathematics culminating in a research paper. No more than 2 credits applicable to major requirements.
- 699 MASTER'S THESIS** 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.
- 721,2 FUNCTIONAL ANALYSIS I AND II** 3 credits each
Prerequisites: 510 and 621. These courses are sequential. Study of normed linear spaces and transformations between them with an emphasis on the formulation and analysis of differential and integral equations as operator equations on these spaces.
- 726 APPROXIMATION THEORY** 3 credits
Prerequisites: 522 and 525 or equivalent. Analytical and numerical approximation of functions and other mathematical quantities which are either difficult or impossible to compute, or which defy reasonable representation.
- 728 MATRIX ITERATIVE ANALYSIS** 3 credits
Prerequisite: 312 or permission of the instructor. Basic iterative methods, Matrix Properties and Concepts, Linear and Nonlinear equation solver, Semi-iterative and conjugate-gradient methods.
- 730 ADVANCED NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS** 3 credits
Prerequisites: 522 and 528, or 628, or equivalent. Derivation, analysis, and implementation of difference and variational-based methods for the solution of partial differential equations and systems of differential equations.
- 731,2 ADVANCED PARTIAL DIFFERENTIAL EQUATIONS I AND II** 3 credits each
Prerequisites: 522 and 532 or equivalent. Well-posedness of elliptic, hyperbolic and parabolic problems. Variational Methods for Elliptic problems, Conservation Laws and numerical methods, potential theory and integral equations.
- 733,4 ASYMPTOTIC METHODS AND NONLINEAR ANALYSIS I AND II** 3 credits each
Prerequisites: 633/634 or equivalent. Survey of asymptotic and perturbation methods as applied to integrals and differential equations. Topics: bifurcation and stability with applications from the physical sciences and engineering.
- 735 DYNAMICAL SYSTEMS** 3 credits
Prerequisite: 522 or equivalent. The study of mathematical models of systems which evolve over time. An introduction to maps and applications to ordinary differential equations.
- 736 DISTRIBUTION THEORY** 3 credits
Prerequisites: 621 and 634 or equivalent. Study of the theory of distributions and its applications. Topics: basic concepts, distributional calculus, Fourier and Laplace transforms theory, function space theory, and applications to partial differential equations.
- 737 THEORY OF TRANSFORMS** 3 credits
Prerequisites: 525 and 621 or equivalent. The theory of continuous and discrete transforms, including Laplace, Fourier, Hartley and other transforms, as well as fast implementations. The theory of wavelets is a major topic.

COMPUTER SCIENCE

3460:

- 506 INTRODUCTION TO C AND UNIX** 3 credits
Prerequisite: Programming experience. C language programming. UNIX shell programming, file structure, system calls, and interprocess communication. (Not an approved mathematical sciences major, minor, or certificate elective.)
- 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
Prerequisite: 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
Prerequisite: 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 COMMUNICATIONS AND COMPUTER NETWORKS** 3 credits
Prerequisites: 210 (and 330 or knowledge of C). ISO-OSI, TCP/IP, SNA data switching, protocols, flow and error control, routing, topology. Network trends, network taxonomies, and socket-based programming.
- 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 grammar; finite, pushdown and linear-bounded automata; turning machines; closure properties; computational complexity, stack automata and decidability.
- 575 DATA-BASE MANAGEMENT** 3 credits
Prerequisite: 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 members.
- 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.
- 626 ADVANCED OPERATING SYSTEMS** 3 credits
Prerequisite: 426/526 or equivalent. Advanced topics in operating system design: synchronization mechanisms, performance evaluation, security, distributed operating systems.
- 635 ADVANCED ALGORITHMS AND COMPLEXITY THEORY** 3 credits
Prerequisite: 435/535 or equivalent. Advanced graph algorithms, matrix multiplication, fast Fourier transforms, lower bound theory, complexity hierarchies, NP-complete and intractable problems, approximation techniques.
- 640 ADVANCED COMPILER DESIGN AND CONSTRUCTION** 3 credits
Prerequisite: 440/540 or equivalent. Continuation of 440/540. Theory of LL(k) and LR(k) parsing, compiler writing tools and environments, code optimization, implementation of advanced language features. Major programming project required.
- 655 COMPUTER NETWORKS AND DISTRIBUTED PROCESSING** 3 credits
Prerequisites: 465/565 and 455/555. Interconnection technologies, protocol layering models, datagram and stream transport services, client-server paradigm, principles and protocols of interconnected networks operating as unified systems, and TCP/IP technology.
- 657 ADVANCED COMPUTER GRAPHICS** 3 credits
Prerequisites: 457/557, knowledge of C and UNIX. Topics include 3D viewing and projections, image manipulation, 3D transformations, color shading, clipping and animation via raster files, fractal mapping, surface rendering, and solid mapping.
- 660 EXPERT SYSTEMS** 3 credits
Prerequisite: 460/560 or maturity in mathematics. Architecture of expert systems, knowledge representation and acquisition, inference mechanisms for expert systems, uncertainty management, expert system tools and applications.
- 665 ADVANCED COMPUTER ARCHITECTURE** 3 credits
Prerequisite: 465/565 or equivalent. Fundamentals of computer analysis and design, with emphasis on cost/performance tradeoffs. Studies of pipelined, vector, RISC, and multiprocessor architectures.
- 667 PARALLEL PROCESSING** 3 credits
Prerequisite: Working experience in UNIX, C, and FORTRAN. Advanced computer architectures, theories of parallel computing, system resources optimization, efficient programming languages and application requirements of cost-effective computer systems. Classical results and practical insights into implementing parallel algorithms on actual parallel machines.
- 670 ADVANCED AUTOMATA AND COMPUTABILITY** 3 credits
Prerequisite: 470/570 or equivalent. An in-depth study of concepts related to computability. Topics include nondeterministic automata, recursive function theory, the Chomsky hierarchy, Turing machines and undecidability.
- 675 ADVANCED DATABASE MANAGEMENT** 3 credits
Prerequisite: 475/575 or equivalent. Relational database theory, including formal query languages; query processing and optimization techniques; reliability techniques including recovery, concurrency, security, and integrity; current trends in database technology.
- 680 SOFTWARE ENGINEERING** 3 credits
Prerequisites: 307 and 316. Introduction to current techniques and methodologies used in software design, development, validation, and maintenance.
- 692 SEMINAR IN COMPUTER SCIENCE** 1-3 credits
(May be repeated) Prerequisite: permission of advisor. Seminar-type discussions on topics in computer science. No more than 2 credits apply to major requirements.

- 698 MASTER'S RESEARCH** 1-6 credits
(May be repeated) Prerequisite: permission of advisor. Research in suitable topics in computer science culminating in a research paper. No more than 2 credits applicable to major requirements.
- 699 MASTER'S THESIS** 2 credits
Prerequisite: permission. (May be repeated for a total of 4 credits.) A properly qualified candidate for a master's degree may obtain 2-4 credits for research experience which culminates in presentation of a faculty-supervised thesis.
- 710 ADVANCED COMPUTING TECHNIQUES IN PHYSICAL SCIENCES** 3 credits
Prerequisites: Programming experience in FORTRAN; 3450:527 or 528 or 627; a knowledge of the UNIX operating system. Introduction to current trends and techniques in scientific computing. Topics include numerical software design, symbolic computation, and parallel computing.

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, extreme 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 description 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.
- 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 CORRELATIONS** 3 credits
Prerequisites: 560 or 561 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
Prerequisites: 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 correlations, application.
- 675 RESPONSE SURFACE METHODOLOGY** 3 credits
Prerequisite: 462/562 or equivalent. First and second order response designs, efficient experimental plans, methods for the analysis, and optimization of response functions.
- 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 SEMINAR IN STATISTICS** 1-3 credits
(May be repeated) Prerequisite: permission of advisor. Seminar-type discussion on topics in statistics leading to supervised research project. No more than 2 credits apply to major requirements.
- 695 PRACTICUM IN STATISTICS AND MATHEMATICS** 1-3 credits
Prerequisite: graduate teaching assistant or permission. Training and experience in college teaching of statistics. May not be used to meet degree requirements. May be taken only on a credit/non-credit basis.
- 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.
- 698 MASTER'S RESEARCH** 1-6 credits
(May be repeated) Prerequisite: permission of advisor. Research in suitable topics in statistics culminating in a research paper. No more than 2 credits applicable to major requirements.
- 699 MASTER'S THESIS** 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.

ENGINEERING APPLIED MATHEMATICS 3490:

- 701.2 INTERDISCIPLINARY RESEARCH SEMINAR** 3 credits each
Prerequisite: Permission. For students seeking graduate degrees in Applied Mathematics. An introduction to applied mathematics research in the mathematical sciences, physical sciences, and engineering.
- 790 ADVANCED SEMINAR IN APPLIED MATHEMATICS** 1-4 credits
Prerequisite: Permission. (May be repeated for a total of 12 credits.) For students seeking graduate degrees in Applied Mathematics. Advanced projects and studies in various areas of applied mathematics.
- 898 PRELIMINARY RESEARCH** 1-15 credits
Prerequisite: Permission. (May be repeated.) Completion of qualifying examination and approval of Student Advisory Committee. Preliminary investigation of Ph.D. dissertation topic.
- 899 DOCTORAL DISSERTATION** 1-15 credits
Prerequisite: Permission. (May be repeated.) Completion of Candidacy examination and approval of Student Advisory Committee. Original research by a Ph.D. candidate.

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
Prerequisite: 302 or equivalent. 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: 305 or 306 or equivalent. Reading and discussion of selected Medieval and Renaissance literary works. Conducted in French.

- 511 17TH CENTURY FRENCH LITERATURE** 4 credits
Prerequisite: 305 or 306 or equivalent. Reading and discussion of selected works in poetry, drama and novels. Conducted in French.
- 515 18TH CENTURY FRENCH LITERATURE** 4 credits
Prerequisite: 305 or 306 or equivalent. Reading and discussion of selected authors: emphasis on the *Philosophes*. Conducted in French.
- 519 19TH CENTURY FRENCH LITERATURE** 4 credits
Prerequisite: 305 or 306 or equivalent. Reading and discussion of selected works pertaining to romantic, realistic and naturalistic movements. Conducted in French.
- 522 SPECIAL TOPICS IN ADVANCED LANGUAGE SKILLS OR CULTURE OR LITERATURE** 1-4 credits
Prerequisite: 202 or equivalent. (May be repeated.) Development of specialized language skills or reading of significant works of literature or culture not studied in other courses.
- 527 20TH CENTURY FRENCH LITERATURE** 4 credits
Prerequisite: 305 or 306 or equivalent. Reading and discussion of the most representative works of period. Conducted in French.
- 529 FRANCOPHONE CARIBBEAN LITERATURE** 3 credits
Prerequisites: 305 or 306 or equivalent. 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: 305 and 306 or equivalent. 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. Prepares students for graduate reading examination. Does not count toward French major.
- 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 MASTER'S THESIS** 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, Hebbel, 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 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 Neoclassicism and Romanticism. 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 writers 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 SPECIALIZED LANGUAGE SKILLS OR CULTURE OR LITERATURE** 1-4 credits
Prerequisite: 202 or equivalent. (May be repeated.) Development of specialized language skills or reading of significant works of literature or culture 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 18TH 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 contests approved for graduate work in Spanish.
- 699 MASTER'S THESIS** 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 *Theatetus* including: *Parmenides*, *Sophist*, *Statesman*, *Philebus*.

- 518 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, Tye and Austen.
- 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
Prerequisites: 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 in philosophy, 314 or permission of instructor. In-depth 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 philosophical 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 explanations, 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 course 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.
- 626 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 MASTER'S THESIS** 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, current, 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.
- 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 ADVANCE 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.
- 568 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 broadline and high-resolution NMR spectra. NMR instrumentation and operating principles. Theory and analysis of high-resolution NMR spectra. Quantitative applications of broadline 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.
- 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) Prerequisite: permission. Further investigations of various selected topics in physics, under guidance of faculty member.
- 597 INDEPENDENT STUDY** 1-4 credits
(May be repeated) Prerequisite: permission. Further investigations of various selected topics in physics, under guidance of faculty member.
- 598 PHYSICS COLLOQUIUM** 1 credit
Lectures on current research topics in physics by invited speakers. May be repeated, but only one credit counts toward M.S. degree.
- 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-Gordan 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 super conductivity.
- 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.
- 685 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.
- 686 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** 1-3 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.
- 691 SEMINAR IN THEORETICAL 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** 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.

POLITICAL SCIENCE 3700:

- 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 sociocultural, 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 SURVEY RESEARCH METHODS** 3 credits
Prerequisite: 100 or 201 or permission. Study of the survey research methods as applied to the analysis of public opinion, political behavior and public policy formation.
- 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 I** 3 credits
Prerequisite: six credits of political science or permission. Reading, research and practice in campaign management.
- 571 CAMPAIGN MANAGEMENT II** 3 credits
Prerequisite: 470/570. The second course in campaign management. Focus is on timing, coalition building, candidate positioning, event planning, internal organization, and other elements of campaign strategy.
- 572 CAMPAIGN FINANCE** 3 credits
Prerequisite: six credits of political science or permission. Reading and research in financial decision making in political campaigns.
- 573 VOTER CONTACT AND ELECTIONS** 3 credits
Prerequisite: six credits of political science or permission. Theoretical and practical approaches to gaining votes in all types of political campaigns.
- 574 POLITICAL OPINION, BEHAVIOR AND ELECTORAL POLITICS** 3 credits
Prerequisite: 100 or 201 or permission. Advanced analysis of psychological, cultural and group processes of opinion formation and change. Attention given to the effect of opinion change on electoral outcomes.
- 575 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.
- 576 AMERICAN POLITICAL PARTIES** 3 credits
Prerequisite: 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
Prerequisite: 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
Prerequisite: 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 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 ON 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.
- 672 SEMINAR: POLITICAL INFLUENCE AND ORGANIZATIONS** 3 credits
Prerequisites: permission. Examination of how public concerns and demands are resolved or diffused. A theoretical and applied look at parties, interest groups, public opinion, media, and protest.
- 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, 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 MASTER'S THESIS** 2-6 credits
- 550 COGNITIVE DEVELOPMENT** 4 credits
Prerequisite: Admission to the Graduate School. 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: Admission to the Graduate School. Psychology in pre-scientific period and details of developmental or systematic viewpoints in 19th and 20th Centuries.
- 590 WORKSHOP IN PSYCHOLOGY** 1-5 credits
Prerequisite: Admission to the Graduate School. (May be repeated. May not be used to meet undergraduate or graduate major requirements in psychology.) Group studies of special topics in psychology.
- 601.2 PSYCHOLOGICAL RESEARCH USING QUANTITATIVE AND COMPUTER METHODS I AND II** 4 credits each
Sequential 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 APPLIED COGNITIVE AGING 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 applied cognitive aging 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 MASTER'S THESIS** 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.

PSYCHOLOGY

3750:

- 500 PERSONALITY** 4 credits
Prerequisite: Admission to the Graduate School. 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
Prerequisite: Admission to the Graduate School. Consideration of the 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
Prerequisite: Admission to the Graduate School. Survey of syndromes, etiology, diagnoses and treatments of major psychological conditions ranging from transient maladjustments to psychoses.
- 530 PSYCHOLOGICAL DISORDERS OF CHILDREN** 4 credits
Prerequisite: Admission to the Graduate School. Survey of syndromes, etiologies and treatments of behavioral disorders in children from the standpoint of developmental psychology. Behavioral data and treatment approaches emphasized.
- 543 HUMAN RESOURCE MANAGEMENT** 4 credits
Prerequisite: Admission to the Graduate School. 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
Prerequisite: Admission to the Graduate School. 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
Prerequisite: Admission to the Graduate School. Intensive investigation of factors affecting behavior and performance in small groups including effects of personality, social structures, task, situation and social-cognitive variables.

- 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.
- 726 **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 **APPLIED COGNITIVE AGING PSYCHOLOGY: INFORMATION PROCESSING** 4 credits
Prerequisite: 620, 727, and graduate standing in psychology; or instructor permission. Perception, learning, motivation, attention, and problem solving in adulthood and their effects on areas such as environmental design, mobility, independence, neuropsychological assessment, and skilled performance.
- 732 **APPLIED COGNITIVE AGING PSYCHOLOGY: HIGHER PROCESSES** 4 credits
Prerequisite: 620, 727, and graduate standing in psychology; or instructor permission. Memory, comprehension, decision processes, intelligence, and knowledge, and their relation to everyday functioning in areas such as dementia, communication, judgment, awareness, expertise, wisdom, and creativity.
- 733 **APPLIED COGNITIVE AGING: RESEARCH** 4 credits
Intensive reading in selected content area, design and conduct of a complete research study. May be repeated.
- 736 **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, 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.
- 761 **INFORMATION PROCESSING AND INDUSTRIAL/ ORGANIZATIONAL PSYCHOLOGY** 4 credits
Prerequisites: 610, 620, 630, and 640. Coverage of current theories in cognitive psychology is applied to traditional concerns of industrial/organizational psychology such as performance appraisal or motivation.
- 780 **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 **DOCTORAL DISSERTATION** 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 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.
- 594 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 major 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 intend 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 7214) 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 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 7210a) 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.
- 646 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, professional 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.
- 664 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
Prerequisite: permission. 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 MASTER'S THESIS** 2-5 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.

ANTHROPOLOGY

3870:

- 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 includes 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 credit
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 DOCTORAL DISSERTATION** 1-10 credits
(Must be repeated for a minimum of 30 credits) Dissertation. (Same as KSU 82199)

- 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.

PUBLIC ADMINISTRATION AND 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.
- 623 PUBLIC WORKS ADMINISTRATION** 3 credits
Prerequisite: permission. Examines the building, maintenance and management of public works.
- 636 PARKS AND RECREATION** 3 credits
Prerequisite: permission. Deals with theory, practice, evaluation of recreational administration, parks planning.
- 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 FEATURES** 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 MASTER'S THESIS** 1-9 credits
Prerequisite: permission. Supervised thesis writing. (May be repeated for a total of nine credits.)
- 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 tradition 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 DOCTORAL DISSERTATION** 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.
- 572 SEPARATION PROCESSES IN BIOCHEMICAL ENGINEERING** 3 credits
Prerequisite: 353. Introduction to the separation and purification techniques pertinent to bioprocesses, with emphasis on the engineering considerations for large-scale operations.
- 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. Predication and correlation of thermodynamic data. Phase and reaction equilibria.
- 622 BIOCHEMICAL ENGINEERING** 3 credits
Application of chemical engineering principles to biological processes which produce desirable compounds or destroy unwanted or hazardous substances.
- 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.
- 634 APPLIED SURFACTANT SCIENCE** 3 credits
Prerequisite: 610. The basics of surfactant science, the chemical engineering application of surfactants including use in polymerization media, separations, emulsion, microemulsion, and a rheology modifier.
- 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.
- 680 HETEROGENEOUS CATALYSIS** 3 credits
Prerequisite: 330. Kinetics and mechanisms of heterogeneous and homogeneous catalytic reactions; characterization and design of heterogeneous catalysts.
- 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.
- 698 MASTER'S RESEARCH** 1-6 credits
Prerequisite: Permission of advisor. (May be repeated.) Research on a suitable topic in chemical engineering culminating in a master's thesis.
- 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.
- 738 CHEMICAL PROCESSING OF ADVANCED MATERIALS** 3 credits
Prerequisite: 605. Advanced materials such as ceramics, optical materials, sensors, catalysts; application of reaction engineering to sol-gel processing, ceramic processing, modified chemical vapor deposition.
- 742 ADVANCED CATALYST DESIGN** 3 credits
Prerequisite: 605. Development of catalysis theory and its application to the design of practical catalysts.
- 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.
- 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.

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.
- 523 CHEMISTRY FOR ENVIRONMENTAL ENGINEERS** 3 credits (2 lecture - 1 lab)
Prerequisite: One year of college chemistry. General, physical, organic, biochemistry, equilibrium, and colloid chemistry concepts applied to environmental engineering. Concepts are used in water and wastewater laboratory.
- 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 COMPUTER METHODS OF STRUCTURAL ANALYSIS** 3 credits
Structural analysis using microcomputers, finite element software, interactive graphics, beam stiffness concepts and matrix formulation; simple and complex structural systems modeling; vibration analysis.
- 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 (Abson 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 Castiglano'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.
- 608 MULTISTORY BUILDING DESIGN** 3 credits
Prerequisite: 401. Floor systems; staggered truss system; braced frame design; unbraced frame design; drift indices; monocoque (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 an 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 under ground structures including conduits, tunnels and shafts. Advanced foundation construction methods and problems including dewatering, soil stabilization, underpinning and cofferdams. Slope stability analysis.
- 616 SOIL IMPROVEMENT** 3 credits
Prerequisites: 313 and 314. Admixture stabilization, precompression with vertical drains, blasting, vibrocompaction, injection and grouting, thermal methods, electro-osmosis, soil reinforcement, case studies.
- 617 NUMERICAL METHODS IN GEOTECHNICAL ENGINEERING** 3 credits
Prerequisites: 313 and 314. Steady-state and transient flow through soils, consolidation, soil-structure interaction, piling, stress-deformation analysis of earth structures.
- 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 WASTE-WATER 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 PROCESS 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: 4500/310 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 ENGINEERING REPORT** 2 credits
Prerequisite: Permission of advisor. A relevant problem in civil engineering for students electing the non-thesis option. The final engineering report must be approved by the advisor and the advisory committee.
- 698 MASTER'S RESEARCH** 1-6 credits
Prerequisite: Permission of advisor. (May be repeated.) Research on a suitable topic in civil engineering culminating in a master's thesis.
- 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 difference. 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
Prerequisite: 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 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 I** 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 THEORY** 3 credits
Prerequisite: 354 or equivalent. Theory of EM radiation. Wire antennas, arrays, receiving antennas, reciprocity. Integral equations for induced currents, self and mutual impedances. Equivalent principle, radiation from aperture antennas.
- 555 MICROWAVES** 4 credits
Prerequisite: 354 or equivalent. 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/AD, 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.
- 598 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, multi-level 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 or permission. Sources, channels, entropy, mutual information, source coding theorem and channel coding theorem. Channel coding theorem for waveform channels. Introduction to rate-distortion theory.
- 644 CHANNEL CODING** 3 credits
Prerequisite: 641 or permission. Algebraic structure of error-control codes; techniques for encoding and decoding. Coverage of the major classes of linear block codes and convolutional codes.
- 646 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 or permission. Signal detection, estimation of signal parameters in noise: Bayes, minimax, Neyman-Pearson criteria; nonparametric and robust procedures; Wiener and Kalman filtering.
- 649 STATISTICAL COMMUNICATION THEORY** 3 credits
Prerequisite: 641 or permission. Fundamental principles of transmission of digital information over noisy channels. Optimum receivers. Bandwidth and dimension. Capacity of the band-limited white gaussian noise channel.
- 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. Advance 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 lightening 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
Prerequisite: 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 lower 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. Credits dependent upon nature and extent of project.
- 698 MASTER'S RESEARCH** 1-6 credits
Prerequisite: Permission of advisor. (May be repeated.) Research on a suitable topic in electrical engineering culminating in a master's thesis.
- 699 MASTER'S 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 for graduate students in communication, control, and mathematics.
- 753 TOPICS IN ELECTROMAGNETICS** 3 credits
Prerequisite: 651. Introduction to advanced techniques in fields. Topics include application of Green's function 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 OBJECT ORIENTED DESIGN** 3 credits
Prerequisites: 3480/208 or equivalent. Investigation of object-oriented design paradigm and the design implementation with the object-oriented programming language C++.
- 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.
- 607 PARALLEL COMPUTER ARCHITECTURE** 3 credits
Prerequisite: 606 or equivalent. This course provides an introduction to parallel computer architectures and parallel processing based on a single instruction, message-passing, or shared memory.
- 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.
- 620 FAULT-TOLERANT COMPUTING** 3 credits
Prerequisite: 363 or equivalent. This course encompasses the many aspects of fault-tolerant computing and covers reliability, fault-models, fault-tolerant design techniques, quantitative evaluation methods, testing, and design for testability.
- 642 ADVANCED KNOWLEDGE ENGINEERING** 3 credits
Prerequisite: 641 or equivalent. Advanced study of knowledge acquisition and expert system project management.
- 643 FRAME-BASED EXPERT SYSTEM DESIGN** 3 credits
Prerequisites: 441, 641, or equivalent. Introduction to the design and development of frame-based expert systems.
- 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.
- 513 INTRODUCTION TO AERODYNAMICS** 3 credits
Prerequisites: 300 and 310 or permission. Introduction of aerodynamic concepts; conformal transformations, theory of thin airfoils, 2-dimensional airfoil theory, wings of finite span, lifting line theories, lumped-vortex, vortex-lattice, and panel methods.
- 514 INTRODUCTION TO AEROSPACE PROPULSION** 3 credits
Prerequisites: 300 and 310 or permission. Introduction to propulsion systems currently used in the aerospace field; propulsion principles for turbojets, turbofans, ramjets, chemical rockets, and electrical rocket propulsion.
- 515 ENERGY CONVERSION** 3 credits
Prerequisites: 310, 315. Topics from fields of internal combustion engines, cycle analysis, modern conversion devices.
- 516 ENERGY 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.
- 563 COMPUTER AIDED DESIGN AND MANUFACTURING** 3 credits
Prerequisite: 460 or permission. The use of computer systems to assist in the creation, modification, analysis, or optimization of engineering designs, and to plan, manage, and control manufacturing plants.
- 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.
- 626 FATIGUE OF ENGINEERING MATERIALS** 3 credits
Prerequisite: 624 or permission. Quasi-static and cyclic behavior; dislocation networks and their interactions; correlation of dislocation-microstructure interactions; crack initiation; crack propagation; short cracks; crack closure; environmental effects.
- 627 ADVANCED MATERIALS AND MANUFACTURING PROCESSES** 3 credits
Prerequisite: 380. Manufacturing processes for advanced materials; classification; technological aspects of bulk deformation, casting, joining, forming, machining, molding, powder metallurgy, rapid solidification; economic aspects; technical activity.
- 628 MECHANICAL BEHAVIOR OF MATERIALS** 3 credits
Prerequisite: 380 or permission. Mechanical behavior of engineering materials; metallurgy of deformation; dislocation effects and deformation; strengthening mechanisms; thermomechanical processing; mechanical testing.
- 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, controllability 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 or by permission. Obtaining mathematical models of processing 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.
- 665 CORD MECHANICS** 3 credits
Prerequisite: 622. Elastic and viscoelastic theory of wire rope is derived from thin rod theory. Applications are discussed with respect to tire mechanics, bioengineering and lamina composite constructions.
- 693 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.
- 696 SPECIAL TOPICS IN MECHANICAL ENGINEERING** 1-4 credits
Prerequisite: permission. For qualified candidate for graduate degree. Supervised research in the student's major field of training or experience. Credit depends upon nature and extent of project as determined by adviser and department head.
- 697 ENGINEERING REPORT** 2 credits
Prerequisite: Permission of advisor. A relevant problem in mechanical engineering for students electing the non-thesis option. The final engineering report must be approved by the advisor and the advisory committee.
- 698 MASTER'S RESEARCH** 1-6 credits
Prerequisite: Permission of advisor. (May be repeated.) Research on a suitable topic in mechanical engineering culminating in a master's thesis.
- 699 MASTER'S THESIS** 1-4 credits
Prerequisite: permission of advisor. 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 of 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.
- 898 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.
- 899 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.

- 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 fracture and fracture healing. Mechanics of external and internal fixators. Total joint implants and reconstruction techniques.
- 644 MUSCLE MECHANICS AND OPTIMIZATION** 3 credits
Prerequisite: Graduate standing in the College of Engineering or by permission. Human body joint kinetics, muscle mechanics and modelling. The principles of optimization as applied to muscle forces, along with muscle anatomy and physiology.
- 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.
- 647 KINEMATICS OF THE HUMAN BODY** 3 credits
Prerequisites: 4600:321 or equivalent, graduate standing in the College of Engineering or by permission. Analytical methods used to model and quantify human body motion. Three-dimensional kinematics, joint coordinate systems, functional anatomy, segment center of mass and joint centers.
- 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, 562 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.
- 655 REHABILITATION ENGINEERING** 3 credits
Prerequisites: graduate standing in engineering, mathematics, or science; or permission of the instructor. Devices for rehabilitation, interfacing the motor and/or sensory impaired, quantitative assessment techniques, prosthetics and orthotics, bedside mechanics, emerging technologies.
- 660 BIOMATERIALS AND LABORATORY** 4 credits
Corequisite: 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.
- 670 MATHEMATICAL MODELING IN BIOLOGY AND MEDICINE** 3 credits
Prerequisites: graduate standing in engineering, mathematics, or physics; or permission of instructor. Modeling of pharmacokinetic, cardiovascular, neuromuscular, and immune systems, and artificial organ interactions. Deterministic and stochastic approaches.
- 685 MEDICAL DEVICES AND ARTIFICIAL ORGANS** 3 credits
Prerequisites: graduate standing in engineering, mathematics, or science; or permission of instructor. Design of medical devices and artificial organs, requirements, safety considerations, tissue constraints, optimization techniques, government regulations, and legal liability.
- 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.
- 698 MASTER'S RESEARCH** 1-6 credits
Prerequisite: permission of advisor. (May be repeated.) Research on a suitable topic in biomedical engineering culminating in a master's thesis.
- 699 MASTER'S THESIS** 1-6 credits
Prerequisite: permission of advisor. Supervised research in the specific area of biomedical engineering.
- 898 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.

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 analysis. 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 nonparametric 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 lassial 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.

College of Education

EDUCATIONAL FOUNDATIONS

5100:

- 512 DESIGN AND PRODUCTION OF INSTRUCTIONAL MATERIALS** 3 credits (20 clinical hours)
Design, adaptation and preparation of instructional materials using graphics, transparency production, video equipment, computer authoring software, mounting and laminating processes, photography and other procedures.
- 514 ORGANIZING AND SUPERVISING EDUCATIONAL MEDIAL PROGRAMS** 3 credits
Prerequisite: 310 or permission of the instructor. Procedures for planning, organizing and evaluation educational media programs including media facilities and services.
- 520 INTRODUCTION TO INSTRUCTIONAL COMPUTING** 3 credits
Examines the use of word processing, spread sheets, databases, graphics, telecommunications and authoring software in both educational and business settings and evaluates instructional and applications software.
- 590,1,2 WORKSHOP** 1-3 credits
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 TOPICAL SEMINAR IN EDUCATIONAL TECHNOLOGY** 3 credits
(Repeatable for up to nine credits.) Current trends and practices in educational technology: computer authoring software, tools and processes for instructional video production, presentation systems.
- 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.
- 646 MULTICULTURAL COUNSELING** 3 credits
Prerequisites: 5600/643 or permission of instructor. An examination of multicultural counseling theory and research necessary to work with culturally diverse people.
- 648 INDIVIDUAL AND FAMILY DEVELOPMENT ACROSS THE LIFESPAN** 3 credits
An exploration of individual and family development. Emphasis will be placed on understanding the relationship between the individual and his/her family.
- 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.
- 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 problems in educational foundations.
- 699 MASTER'S THESIS** 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 MASTER'S THESIS** 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 DOCTORAL 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.
- 530 INSTRUCTIONAL AND MANAGEMENT PRACTICES** 3 credits
Prerequisite: 780. Students will learn to use both teaching models and management strategies to achieve effectiveness in instructions. Also included are educational issues that relate to effective management and instruction.
- 535 CONCEPTS AND CURRICULUM DESIGNS IN ECONOMIC EDUCATION** 3 credits
Economic education concepts appropriate from 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** 1-6 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 MASTER'S THESIS** 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** 1-6 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 DOCTORAL 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 LEARNER** 3 credits
Describes characteristics of the postsecondary learner; studies issues, factors, and strategies pertinent to successful facilitation of learning in a variety of postsecondary 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 CURRICULUM DEVELOPMENT 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.
- 531 CURRICULUM DEVELOPMENT FOR TECHNICAL EDUCATION LAB** 1 credit
Prerequisite: admission to Technical Education program or permission of instructor. Corequisite: 530. The development of a curriculum for a technical postsecondary program.
- 535 INSTRUCTIONAL TECHNIQUES IN TECHNICAL EDUCATION** 4 credits
Prerequisite: 530. Selected topics of instructional techniques appropriate to postsecondary technical education. Emphasis is placed on instructional methods, techniques in the classroom, laboratory including tests, and measurements.
- 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 observation.
- 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.
- 661 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 MASTER'S THESIS** 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 FOUNDATIONS AND ELEMENTS OF ADAPTED PHYSICAL EDUCATION** 3 credits
Principles, components, and strategies necessary in providing motor activities for handicapped students via application of a neuro-developmental model and alternative methods. Three hour lecture.
- 541 ADVANCED ATHLETIC INJURY MANAGEMENT** 4 credits (30 clinical hours)
Prerequisites: 3100:208/209, 5550:240. 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)
Prerequisites: 3100:208/209, 5550:240. 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.
- 551 ASSESSMENT AND EVALUATION IN ADAPTED PHYSICAL EDUCATION** 3 credits (20 clinical hours)
Prerequisite: Permission of adviser. Investigation analysis, and selection of appropriate assessment instruments, as well as methodology for determining instructional objectives and activities for handicapped students. Three hour lecture.
- 555 MOTOR DEVELOPMENT OF SPECIAL POPULATIONS** 3 credits
Prerequisites: Permission of adviser. Task analysis essential to structuring activity sequences for motor skills and lifetime fitness activities for handicapped children. Three hour lecture.

- 590,1,2 WORKSHOP** 1-3 credits
Practical, intensive, and concentrated involvement with current curricular practices in areas related to physical education.
- 593 EDUCATIONAL INSTITUTES AND FOUNDATIONS** 1-4 credits
Practical experience with current research or curricular practices involving expert resource person with physical education, and usually financed by private or public funding.
- 601 ADMINISTRATION OF PHYSICAL EDUCATION, ATHLETICS AND INTRAMURALS** 3 credits
Techniques of organization, administration and evaluation of physical education, athletics, and intramural programs. Policies and procedures for K-12 program are emphasized.
- 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** 3 credits
Functions of body systems and physiological effects of exercise. Laboratory experiences, lectures, discussions.
- 606 STATISTICS: QUANTITATIVE AND QUALITATIVE METHODS** 3 credits
Prerequisite: 5100:640. Research methods/designs, statistics (application and interpretation), use of computers and appropriate software as they relate to various disciplines in the area of physical activity.
- 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 MASTER'S THESIS** 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.
- 522 RESOURCES AND RESOURCE MANAGEMENT FOR THE TEACHING OF OUTDOOR EDUCATION** 4 credits
Resources and instructional techniques which are applicable to outdoor education; and in-depth study of methods and designs, unique to the process of teaching.
- 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 idea, 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
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 TESTS AND APPRAISAL IN COUNSELING** 4 credits
Prerequisites: 5100.640 or a recent course in descriptive statistics and permission of the instructor. Study of the nature of tests and appraisal in counseling including reliability, validity, test construction and selection, administration, scoring, and basic interpretation of selected measures.
- 646 MULTICULTURAL COUNSELING** 3 credits
Prerequisites: 643 or permission of instructor. An examination of multicultural counseling theory and research necessary to work with culturally diverse people.
- 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.
- 648 INDIVIDUAL AND FAMILY DEVELOPMENT ACROSS THE LIFESPAN** 3 credits
An exploration of individual and family development. Emphasis will be placed on understanding the relationship between the individual and his/her family.
- 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.
- 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 IN COUNSELING** 1-4 credits
(May be repeated for a total of 7 credit hours.) Prerequisite: 675. Paid or unpaid supervised experience in counseling.
- 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 demonstration 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 MASTER'S THESES** 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.
- 707,8 SUPERVISION IN COUNSELING PSYCHOLOGY I, II** 3 credits each
Prerequisite: doctoral residency or permission. Instruction and experience in supervising 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, Rogenian, 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.
- 756 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 DOCTORAL 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.
- 546 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 your 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 SPECIAL 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 exception 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 an 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 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 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 a methodological practices unique to individual research and its application to special populations.
- 612 SEMINAR: ISSUES IN SPECIAL EDUCATION** 3 credits
Prerequisites: 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 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 advisor and supervisor of independent study. Specific area of investigation determined in accordance with student's needs.
- 698 MASTER'S THESIS** 2-4 credits
Prerequisite: permission of advisor. 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 MASTER'S THESIS** 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
Prerequisites: 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: CURRENT PROFESSIONAL TOPICS/ISSUES IN SCHOOL PSYCHOLOGY** 3 credits
Prerequisite: permission of instructor. Consideration of pertinent topics/issues in practice of school psychology with emphasis upon field-based concerns of a practicing school psychologist.
- 641 FIELD SEMINAR II: LOW INCIDENCE/RELATED INQUIRIES** 3 credits
Prerequisite: permission of instructor. Consideration of pertinent topics/issues in practice of school psychology with emphasis upon field-based concerns 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 MASTER'S THESIS** 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 in the bilingual/multicultural classroom. 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
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 curriculum units.
- 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 experienced principals.
- 695 FIELD EXPERIENCE FOR SUPERVISORS** 3 credits
Prerequisite: completion of all course work in the program. Designed to help the student apply the knowledge and skills related to direct assistance, curriculum development, in service/staff development, group work, and action research.
- 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 MASTER'S THESIS** 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 communication, 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 need-
ed 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. Extends 5700:610, including supervisory models,
staff development, and the organizational environment's impact on the climate for effective
supervision.
- 745 PRACTICUM IN EDUCATIONAL ADMINISTRATION: URBAN SETTING** 2 credits
Prerequisite: completion of three-fourths of doctoral program courses. Analysis of uniqueness
of urban setting, e.g., multicultural and pluralistic urban populations. Stress on administrator's
human relation skills.
- 746 POLITICS, POWER AND THE SCHOOL ADMINISTRATOR** 3 credits
Impacts of formal and informal community power structures and influential persons on educa-
tional 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.
- 795.6 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.
- 896 FIELD EXPERIENCE IN SCHOOL PLANT PLANNING** 2 credits
Prerequisites: 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) Prerequisites: permission of adviser. In-depth study
of a research problem in education. Student must be able to demonstrate critical and analyti-
cal 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 educa-
tional administration.
- 899 DOCTORAL 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.

- 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 formatting
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 inde-
pendent 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 participation 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 expe-
rience and to provide the opportunity to share ideas and experiences from various areas of
higher education internship placement.

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 educa-
tion.
- 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.
- 720 FINANCE AND HIGHER EDUCATION** 3 credits
Prerequisite: permission of the instructor. Facilitates student's understanding of how Ameri-
can higher education is financed, identifies various methodologies used, and political and eco-
nomic impacts and processes involved.
- 721 LAW AND HIGHER EDUCATION** 3 credits
Prerequisite: permission of the instructor. Legal aspects of higher education, sources of law
and authority presented; impact on, interaction with, and implications for the administration of
higher education discussed.
- 725 SEMINAR IN HIGHER EDUCATION: STUDENT SERVICES** 3 credits
Prerequisite: permission. Topics of concern to student specializing in student personnel ser-
vices 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.

College of Business Administration

ACCOUNTANCY

6200:

- 520 ADVANCED ACCOUNTING** *3 credits*
Prerequisite: 322. Examination of accounting theory emphasizing accounting for business combinations, partnerships, foreign operations, nonprofit entities and consolidated statements.
- 530 TAXATION I** *3 credits*
Prerequisite: 320. Federal tax law related to individuals, partnerships, and corporations. 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. Additional aspects of individual taxation, Federal tax law related to property transfers and retirement and family tax planning.
- 540 AUDITING** *3 credits*
Prerequisites: 321, 255 and 6500:221 must be taken prior to or concurrently. 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: 320 or 601. 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: 322. 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.
- 590 SPECIAL TOPICS IN ACCOUNTING** *1-3 credits*
Prerequisite: Permission of instructor. Opportunity to study special topics and current issues in accounting. May be repeated with a change of subject but not to exceed 6 credits.
- 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 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 on 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 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 QUALIFIED PENSIONS AND PROFIT SHARING** *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: 633. 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. (May be repeated for a total of six credits.)
- 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 effects to both the recipients and payor entities are determined and discussed.
- 661 ADVANCED TAX RESEARCH AND POLICY** *3 credits*
Prerequisites: 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.
- 664 RESEARCH AND QUANTITATIVE METHODS IN ACCOUNTING** *3 credits*
Prerequisites: 6200:610, 6500:601 or equivalent. Survey of research techniques, statistical methods, and data bases with applications to accounting and business functional areas.
- 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** *1-3 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 six credits.) Focus on special topics of study and research in accounting on an independent basis.

FINANCE

6400:

- 591 WORKSHOP IN FINANCE** *1-3 credits*
(May be repeated) Group studies or 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 financial 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.
- 631 FINANCIAL MARKETS AND INSTITUTIONS** *3 credits*
Prerequisite: 602 or equivalent. A study of major financial markets and financial institutions with an emphasis on the decision making processes within a rapidly changing, but regulated operating environment.
- 633 MANAGEMENT OF DEPOSITORY FINANCIAL INSTITUTIONS** *3 credits*
Prerequisites: 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 6500:601 and 602. 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 of 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 and 6500:601. 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 MULTINATIONAL CORPORATE 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.
- 690 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.
- 691 INTERNATIONAL MARKETS AND INVESTMENTS** 3 credits
Prerequisites: 602 or equivalent. A study of international financial markets with an emphasis on international investments and risks in a rapidly changing global economy.
- 697 INDEPENDENT STUDY IN FINANCE** 1-3 credits
(May be repeated for a total of six credits) Focus on special topics of study and research in finance on an independent basis.
- 698 INDEPENDENT STUDY: BUSINESS LAW** 1-3 credits
(May be repeated for a total of six credits) Focus on special topics of study and research in the legal aspects of business administration.
- 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.
- 641 DATA MANAGEMENT AND COMMUNICATION** 3 credits
Prerequisite: 602. The effective management of the data resources of the firm are examined as well as how data communications are changing the way businesses operate.
- 642 SYSTEMS SIMULATION** 3 credits
Prerequisites: 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 ANALYSIS AND DESIGN OF BUSINESS SYSTEMS** 3 credits
Prerequisite: 602. A hands-on treatment of the methods used to develop different types of business information systems.
- 644 MANAGERIAL DECISION SUPPORT AND EXPERT SYSTEMS** 3 credits
Prerequisite: 6500:602. Examines decision support systems and the application of artificial intelligence based systems in today's business environment.
- 645 ADVANCED MANAGEMENT INFORMATION SYSTEMS** 3 credits
Prerequisite: 640. A case-oriented course which examines the problems of managing the Corporate Information Systems activity as regarded by users, general management and IS management.
- 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: 600. Examines the structure, design and overall effectiveness of a business organization from a macro-perspective.
- 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** 3 credits
Prerequisite: 600. A comprehensive approach toward the identification and resolution of pay and benefit problems facing business organization 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 of leaders evaluated. Individual and small group field study assignments.
- 658 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.
- 660 EMPLOYMENT REGULATION** 3 credits
Prerequisite: 652 or equivalent. A broad overview of the federal legislation regulating the business firm's human resource management function.
- 662 APPLIED OPERATIONS RESEARCH** 3 credits
Prerequisite: 601 or equivalent. Survey of basic techniques of operations research. Stresses application to functional area of business.
- 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.
- 670 OPERATIONS MANAGEMENT** 3 credits
Prerequisites: 600, 601 or equivalent. An overview of the strategic, tactical and operational issues directly related to the creation of goods and services.
- 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.
- 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
Prerequisites: 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
Prerequisites: 600, 601, 602. 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.

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 PROJECT** 3 credits
Prerequisite: 670. Student applies modern management principles, practices, theory to an actual problem in industry.
- 580 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 covering principles and concepts of management applied to health services organizations. For those registered for graduate credit, a major paper is required.
- 582 HEALTH SERVICES OPERATIONS MANAGEMENT** 3 credits
Prerequisites: upper-college standing and 301 or 480, or graduate standing and 580 or 600 or permission of instructor. (Students who have completed 331 are ineligible to take this course for credit). Application of operations and systems analysis to 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 ORGANIZATIONAL BEHAVIOR** 3 credits
Course examines management principles, concepts, functions and process, as well as human behavior in organizations.
- 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.

- 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-societal 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 six credits) Focus on special topics of study and research in management on an independent basis.

MARKETING

6600:

- 540 PRODUCT PLANNING** 3 credits
Prerequisite: 600. Examines the creation of new products and the management of existing products through the life cycle. (Graduate credit requires additional research paper.)
- 550 STRATEGIC RETAIL MANAGEMENT** 3 credits
Prerequisite: 600 or permission of instructor. Investigation of strategic and tactical retail decisions and issues through the use of case analysis, computer applications, experiential games, and field projects. (Graduate credit requires additional research paper.)
- 570 BUSINESS TO BUSINESS MARKETING** 3 credits
Prerequisite: 600 or permission of instructor. Studies industrial and organizational buyer behavior. The strategic marketing management practices of firms selling to business organizations, government agencies, and institutions are also examined. (Graduate credit requires additional research paper.)
- 580 SALES MANAGEMENT** 3 credits
Prerequisite: 600 or permission of instructor. Develops analytical and managerial skills through case studies and other learning activities relating to the organization, selection, training motivation, and control of a sales force. (Graduate credit requires additional research paper.)
- 600 MARKETING CONCEPTS** 3 credits
Introductory course examining buyer behavior, environmental influences, target marketing, product development, distribution, promotion, and pricing for business firms and nonprofit organizations within a global context.
- 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.
- 630 MARKETING OF SERVICES** 3 credits
Prerequisite: 600 or permission of instructor. Examines marketing strategies within the service industry. Focuses on both profit (e.g., transportation, financial) and nonprofit (e.g., educational, social) organizations. Product support services are also covered.
- 640 BUSINESS RESEARCH METHODS** 3 credits
Prerequisites: 6500:601 and 602. Covers the scientific methods as well as the gathering and analysis of information to identify opportunities and solve problems within a business organization.
- 650 CONSUMER BEHAVIOR** 3 credits
Prerequisite: 600. Examines the marketplace behavior of individuals, households and organizations. Focus is placed on integrating theoretical models with managerial applications.
- 655 MARKETING COMMUNICATIONS** 3 credits
Prerequisite: 600. The total range of marketing communication tools are examined individually and in the context of planning, developing, and implementing a systematic and integrated communications program.
- 670 COMPETITIVE BUSINESS STRATEGY** 3 credits
Prerequisites: 600:601, 6400:602, 6500:600, and 6600:600. Investigation of competitive business strategy from an industry perspective. The course presents a framework which can be used to understand and develop competitive strategies.
- 680 APPLICATIONS OF MARKETING THEORY** 3 credits
Prerequisite: 600. Examines marketing theories and their applications to business problem-solving and decision-making. Selected readings and field projects are used to enhance the student's managerial skills.
- 697 INDEPENDENT STUDY IN MARKETING** 1-3 credits
(May be repeated for a total of six credits) Focus on special topics of study and research in marketing on an independent basis.

PROFESSIONAL

6700:

- 690 PROFESSIONAL RESPONSIBILITY** 1 credit
Prerequisite: Nine graduate credits. Seminar on the professional responsibilities of business men and women to make them and the business organization in which they work more responsible decision makers.
- 692 INTERNATIONAL BUSINESS** 1 credit
Prerequisite: Nine graduate credits. Enhances understanding of global business issues, present relevant trends and updates, facilitates cross-cultural interaction, and explores applied practices of international business.
- 694 APPLIED BUSINESS DOCUMENTATION AND CONTACT** 1 credit
This course is designed to offer a practicum approach to the skills and strategies for handling specialized documents, contact protocols, and business presentations.
- 696 SPECIAL TOPICS IN PROFESSIONAL DEVELOPMENT** 1 credit
Special topics and current issues in the MBA Program Professional Core. May be repeated with a change of subject, not to exceed 4 credits.
- 698 COLLOQUIUM IN BUSINESS** 1-3 credits
Prerequisite: permission of graduate director. Study of business administration through a seminar of several lectures 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.)

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 six 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.
- 501 SPECIAL TOPICS IN ART HISTORY** 1-3 credits
Prerequisite: 201 or permission. A lecture course focusing on a particular movement, period, artist, or medium. (May be repeated when a different subject or level of investigation is selected.)
- 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 201 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: 14 credits in art history and permission of instructor. 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 INTERIOR DESIGN I** 4 credits
The study of furnishings, interiors, and architecture from antiquity through the eighteenth century, with emphasis on the socio-cultural influences shaping their development.
- 519 HISTORY OF INTERIOR DESIGN II** 4 credits
The study of nineteenth and twentieth-century furnishings and interiors, with emphasis on the socio-cultural influences shaping their development.
- 520 EXPERIMENTAL FOODS** 3 credits
Prerequisites: 246 and 3150/130. Theory and methods used in the experimental study of foods. Analytical procedures in sensory and instrumental evaluation 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. Study of the physiological basis for nutritional requirements; interrelating factors which affect growth, development, maturation and nutritional status from conception through the elderly years.
- 525 ADVANCED TEXTILES** 3 credits
Prerequisite: 121. Evaluation of physical, aesthetic, comfort, care and durability properties of textile products and testing procedures to determine suitability for desired end uses.
- 527 TEXTILE AND APPAREL INDUSTRIES** 3 credits
Prerequisite: 293. Examines the global structure and scope of the textile and apparel industries emphasizing an economic perspective.
- 531 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, 258, 333, 334, 7100/491. A comprehensive study of residential design with emphasis on conceptual, analytical, and graphic skills.
- 534 COMMERCIAL DESIGN** 3 credits
Prerequisites: 158, 258, 333, 334; 7100/491. A comprehensive study of non-residential design 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.
- 537 HISTORIC COSTUME TO 1800** 3 credits
Study of costume and textiles from antiquity through the eighteenth century, with emphasis on social-cultural influences.
- 538 HISTORY OF FASHION SINCE 1780** 3 credits
Prerequisite: 317. Study of nineteenth and twentieth-century western fashions, textiles, and designers with emphasis on social-cultural influences.
- 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 AMERICAN FAMILIES** 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** 3 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
Prerequisite: 3150/130 General chemistry or equivalent. Comprehensive course in the theory and practice of food analysis by classical and modern chemical and instrumental methods. Principles emphasized 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 CP student only. Socio-cultural aspects of community assessment, program implementation and evaluation, and rationales for nutrition services.
- 581 COMMUNITY NUTRITION I-CLINICAL** 1 credit (credit/noncredit)
Prerequisite: CP Students only 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
Prerequisites: 480/580 (481/581 for CP student only). Corequisite: 483/583 for CP student only. This course will focus on managing nutrition services for productivity (economic, community and labor resources, and evaluation), and educating the dietitians' "various publics" about nutrition.
- 583 COMMUNITY NUTRITION II-CLINICAL** 1 credit (credit/noncredit)
Prerequisite: (CP students only) 481/581. Corequisite: 482/582. Field placement in area agencies 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 principals 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.
- 591,2,3 WORKSHOP IN HOME ECONOMICS AND FAMILY ECOLOGY** 1,2,3 credits
Prerequisite: Junior standing. Current issues and topics in selected areas of home economics and family ecology. On/off campus of combined.
- 596 PARENT EDUCATION** 3 credits
Prerequisite: 265, comparable course, or permission. Practical application that reviews and analyzes various parenting techniques with major emphasis on the evaluation of parent education programs.
- 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** 3 credits
Study of individual and family development across life span. Emphasis on adjustment patterns and interpersonal competence. Implications for education theory research and social policy.
- 603 FAMILY RELATIONSHIPS IN MIDDLE AND LATER YEARS** 3 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.
- 604 ORIENTATION TO GRADUATE STUDIES IN HOME ECONOMICS AND FAMILY ECOLOGY** 1 credit
Introduction to the concepts and processes necessary for graduate study in the interdisciplinary field of Home Economics and Family Ecology.
- 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
Prerequisites: undergraduate or graduate-level courses in nutrition and biochemistry. 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 and 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 ADVANCED FOOD THEORY AND APPLICATIONS** 3 credits
Prerequisite: 420/520 or permission. Advanced study of the chemistry and physics of food components, attesting the characteristics of foods, critical evaluation of current basic and applied research emphasized.
- 634 MATERIAL CULTURE STUDIES** 3 credits
Methods of studying clothing, textiles, and interiors from a cultural and historical perspective.
- 639 THEORIES OF FASHION** 3 credits
In-depth analysis of the theories underlying fashion and evaluation of current research related to the study of fashion.
- 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.
- 651 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** 3 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.
- 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.
- 680 HISTORICAL AND CONCEPTUAL BASES OF HOME ECONOMICS AND FAMILY ECOLOGY** 3 credits
History of the field of home economics and family ecology with emphasis on the leaders and the conceptual basis of the field.
- 685 RESEARCH METHODS IN HOME ECONOMICS AND AND FAMILY ECOLOGY** 3 credits
A study of home economics and family ecology research methods emphasizing concept and theory development, policy application and ethical considerations.
- 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 MASTER'S THESIS** 5 credits
Prerequisite: permission of adviser. Preparation of this is pertaining to a selected research project in area of family or child development.

MUSIC

7500:

- 526 GRADUATE MUSIC THEORY REVIEW** 2 credits
Prerequisite: Undergraduate music theory equivalent to four semesters. Review of basic music a 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 CONDUCTION: CHORAL** 2 credits
Prerequisite: 361 or equivalent. Conduction 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 psychology, method books and special problems in teaching addressed.
- 568 GUITAR ARRANGING** 2 credits
Prerequisite: permission of instructor. After comparative analyses of selected examples, student make original solo guitar arrangements of works written for other solo instruments 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 among 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.

MUSICAL ORGANIZATIONS**7510:**

- 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 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 tests 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; discontinuation 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 of 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, sight reading, 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.
- 675 SEMINAR IN MUSIC EDUCATION** 1-3 credits
(May be repeated for a total of 6 credits) intensive examination of special topics in the field of music education.
- 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 MASTER'S THESIS** 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.
- 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.
- 604 SYMPHONIC BAND** 1 credit
Membership by audition. The University Symphonic Band is the most select band at the University and performs the most demanding and challenging music available.
- 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 ensemble performance.
- 617 COLLEGIUM MUSICUM** 1 credit
Prerequisite: permission of instructor. A musical ensemble that performs music written before 1750 on copies of authentic instruments.
- 618 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.
- 625 CONCERT BAND** 1 credit
Membership by Audition. Performs the finest in concert band literature available for concert bands today.
- 626 MARCHING BAND** 1 credit
This organization is noted for its high energy performances a University football games. Enrollment is open to all members of the University student body.
- 627 BLUE AND GOLD BRASS** 1 credit
The official band for Akron home basketball games. Membership is by audition.
- 628 UNIVERSITY BAND** 1 credit
This ensemble is active during spring Semester Only. This concert band is open to all members of the University Community.

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. Courses 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**
- 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**

COMMUNICATION

7600:

- 508 WOMEN, MINORITIES AND NEWS** *3 credits*
Study of images of women and minorities in U.S. news, along with the power women and minorities have as decision-makers in the news industry.
- 535 COMMUNICATION IN ORGANIZATIONS** *3 credits*
Overview of theories and approaches for understanding communication flow and practices in organizations; including interdepartmental, networks, superior-subordinate, formal and informal communication.
- 536 ANALYZING ORGANIZATIONAL COMMUNICATION** *3 credits*
Prerequisite: 535 or permission. Methodology for in-depth analysis and application of communication in organizations; team building, conflict management, communication flow. Individual and group projects; simulations.
- 537 TRAINING METHODS IN COMMUNICATION** *3 credits*
Prerequisite: 345 or permission. Principles and concepts in the design and delivery of communication training programs; integration of theory and methodology; presentation skills; matching methods and learner needs.
- 554 THEORY OF GROUP PROCESSES** *3 credits*
Group communication theory and conference leadership as applied to individual projects and seminar reports.
- 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 settings.
- 566 AUDIO AND VIDEO EDITING** *3 credits*
Prerequisites: 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 non-professional 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.
- 587 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 American film and TV.
- 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 (repeated to 6 hours)*
Prerequisite: permission. Practical application 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.
- 678 RHETORICAL ELEMENTS 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.
- 698 MASTER'S PROJECT/PRODUCTION** 1-6 credits
(May be repeated for a total of six credits.) Prerequisite: Permission of the school director.
- 699 MASTER'S THESIS** 1-6 credits
(May be repeated for a total of six credits.) Prerequisite: Permission of the school director.
- 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** 2 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.
- 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.
- 632 DYSPHAGIA** 2 credits
Outlines etiology, assessment, and treatment for infants, children, and adults with feeding and swallowing disorders (dysphagia). It provides actual experiences in diagnosis and feeding techniques.
- 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: DIFFERENT 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 total of six credits) Prerequisite: permission of instructor. Guided research or reading in selected topics in speech pathology, audiology, or language disorders.
- 699 MASTER'S THESIS** 4-6 credits
(May be repeated for a total of six credits) Prerequisite: permission of School Director.

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.
- 540 AUGMENTATIVE COMMUNICATION** 3 credits
Prerequisite: 330 or 430/530 or permission of instructor. Overviews augmentative communication systems—candidates, symbol systems, devices, vocabulary, funding. Considers interdisciplinary issues in assessment/intervention.
- 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.
- 583 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 neuro-motorically 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.
- 623 SUPPORT SYSTEMS FOR INDIVIDUALS AND FAMILIES WITH COMMUNICATIVE DISORDERS** 2 credits
Enhances students' abilities to interview, provide educational information, and create support systems for persons with communicative handicaps and their families.
- 624 APHASIA** 2 credits
Historical background, current theories and research related to etiology, diagnosis and treatment of adult aphasia.

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 programs 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; must be taken prior to or concurrently with 401 and one of the other practice courses (402, 403, 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 need 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 credit) 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.
- 604 SOCIAL WORK PRACTICE WITH SMALL SYSTEMS** *3 credits*
Prerequisite: graduate status or permission of instructor. Provides the basic knowledge, skills, professional ethics and values necessary for beginning social work practice with small client systems.
- 605 SOCIAL WORK PRACTICE WITH LARGE SYSTEMS** *3 credits*
Prerequisite: 604 or permission of instructor. Provides the basic knowledge, skills, and strategies of social work practice with task groups, organizations and communities.
- 606 FOUNDATION FIELD PRACTICUM** *6 credits*
Prerequisites: graduate status; currently enrolled in or completed foundation coursework. A 2 semester course consisting of a 400 clock hour, supervised internship at a social service agency.
- 611 DYNAMICS OF RACISM AND DISCRIMINATION** *3 credits*
Prerequisite: graduate status or permission of instructor. Provides knowledge of analyzing and understanding the factors leading to and sustaining racism, sexism, homophobia, and the like, at micro and macro levels.
- 622 FUNDAMENTALS OF RESEARCH I** *3 credits*
Prerequisite: graduate status or permission of instructor. This course provides an Introduction to the logic of scientific inquiry, the research process, and the relationship between research and social work practice.
- 623 FUNDAMENTALS OF RESEARCH II** *3 credits*
Prerequisite: 622; statistics course; or permission of instructor. Provides students with an understanding of quantitative and qualitative methodologies and the use of descriptive and inferential statistics in analyzing research data.
- 631 HUMAN BEHAVIOR AND SOCIAL ENVIRONMENT: SMALL SOCIAL SYSTEMS** *3 credits*
Prerequisite: graduate status or permission of instructor. This course focuses on understanding the human behavior and life cycle development of people as individuals and as members of families and other small groups.
- 632 HUMAN BEHAVIOR AND SOCIAL ENVIRONMENT: LARGE SYSTEMS** *3 credits*
Prerequisites: 631 or permission of instructor. This course focuses on the human behavior of people as members of larger social systems including formal and informal organizations, communities and institutions.
- 650 ADVANCED STANDING INTEGRATIVE SEMINAR** *6 credits*
Prerequisite: advanced standing. Provides an integrative view of social work practice with an emphasis on values, foundation knowledge and skills, and evaluation of professional interventions.
- 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.
- 704 ADVANCED PRACTICE WITH SMALL SYSTEMS I** *3 credits*
Prerequisite: second level graduate student or permission of instructor. This course focuses on the differential assessment of individuals, families and small groups and the application of a range of theory bases.
- 705 ADVANCED PRACTICE WITH SMALL SYSTEMS II** *3 credits*
Prerequisite: 704 or permission of instructor. As a continuation of Advanced Practice I, this course focuses on the development and implementation of intervention strategies with and on behalf of small systems.
- 706 ADVANCED FIELD PRACTICUM** *6 credits*
Prerequisites: graduate status; currently enrolled in or completed second year coursework. A 2 semester course consisting of a 600 clock hour, supervised internship in a social service agency, based on the student's concentration and specialization.
- 746 SOCIAL WELFARE POLICY I** *3 credits*
Prerequisite: graduate status or permission of instructor. Examines the historical, philosophical and value bases of social welfare as well as the relationship between social work practice, policy and service delivery.
- 747 SOCIAL WELFARE POLICY II** *3 credits*
Prerequisite: 646 or permission of instructor. This course prepares students with the beginning skills to engage in social problem/policy analysis.
- 755 IMPLICATIONS OF DIVERSITY FOR SOCIAL WORK PRACTICE** *3 credits*
Prerequisite: second level graduate status or permission of instructor. Provides content on the culture and unique strengths of diverse groups and the implications for social work practice at the community level.
- 756 SOCIAL WORK PRACTICE WITH GAYS AND LESBIANS** *3 credits*
Prerequisite: second level graduate status or permission of instructor. This course examines gay and lesbian culture and lifestyles, discrimination based on sexual orientation, and intervention strategies appropriate to practice with gays and lesbians.
- 763 PSYCHOPATHOLOGY AND SOCIAL WORK** *3 credits*
Prerequisite: second level graduate student or permission of instructor. An examination of the symptoms, theories, and psychosocial aspects of mental illness, and the role of the social worker in the treatment of mental disorders.
- 764 SINGLE SYSTEM DESIGN** *3 credits*
Prerequisite: second level graduate student or permission of instructor. Provides students with advanced knowledge about the methodology of single system design and skills to implement an evaluation study of their intervention with clients.

- 765 SUPERVISION AND STAFF DEVELOPMENT** 3 credits
Prerequisite: second level graduate student or permission of instructor. An examination of the purpose, functions, and theories of supervision; the impact of cultural, ethnic and racial differences in supervision/staff development; and problems encountered.
- 771 SOCIAL WORK ADMINISTRATION** 3 credits
Prerequisite: second level graduate student or permission of instructor. This course focuses on supervisory and managerial roles and functions as they are carried out at different hierarchical levels in human service organizations.
- 772 STRATEGIES OF COMMUNITY ORGANIZATION** 3 credits
Prerequisite: second level graduate student or permission of instructor. Emphasizes the historical development and application of several community strategies used to identify community problems, and how to organize and empower diverse community groups.
- 773 INTRODUCTION TO COMMUNITY ORGANIZATION AND PLANNING** 3 credits
Prerequisite: second level graduate student or permission of instructor. A description and analysis of various theoretical concepts and strategic ideas that are used as a framework for Community Organization (CO) practice.
- 774 COMMUNITY, ECONOMIC SYSTEMS AND SOCIAL POLICY ANALYSIS** 3 credits
Prerequisite: second level graduate student or permission of instructor. This course provides a base for understanding economic systems and analyzing the political framework at federal, state, and local levels and their impact on communities.
- 775 PROGRAM EVALUATION** 3 credits
Prerequisite: second level graduate student or permission of instructor. This course provides students with methods of evaluating programs in agencies, including approaches, measurement, design, data collection and analyses employed in program outcome research.
- 776 FISCAL MANAGEMENT OF SOCIAL AGENCIES** 3 credits
Prerequisite: second level graduate student or permission of instructor. This elective course concentrates on the financial management of social administration, financial planning and management, principles of economic and fiscal exchange, accountability and fiscal accounting.
- 780 AGING AND SOCIAL WORK PRACTICE** 3 credits
Prerequisite: second level graduate student or permission of instructor. An examination and evaluation of aging programs and policies, demographic trends and the changing role of social work service providers.
- 781 AGING: POLICIES AND PROGRAMS** 3 credits
Prerequisite: second level graduate student or permission of instructor. An examination and evaluation of aging programs and policies, demographic trends and the changing role of social work service providers.
- 785 SOCIAL WORK PRACTICE: FAMILY AND CHILDREN** 3 credits
Prerequisite: second level graduate student or permission of instructor. Examines the major problems encountered by children and families in the life cycle and explores intervention strategies and programs to address their needs and strengths.
- 786 SOCIAL WELFARE POLICY AND SERVICES: FAMILY AND CHILDREN** 3 credits
Prerequisite: second level graduate student or permission of instructor. Examines the federal and state laws, policies, and services governing children and families, including the supportive, supplemental and substitutive aspects of services.
- 790 ADVANCED PRACTICE AND POLICY IN SUBSTANCE ABUSE** 3 credits
Prerequisite: second level graduate student or permission of instructor. This course provides students the knowledge and skill base necessary for managing and practice with people involved in substance abuse, evaluating programs, and preventive work.
- 795 HEALTH CARE: PLANNING AND POLICY ISSUES** 3 credits
Prerequisite: second level graduate student or permission of instructor. This course is designed to orient students to the planning and policy issues in health care, and how social work can interface with health care.
- 796 EPIDEMIOLOGIC ANALYSIS OF HEALTH AND SOCIAL PROBLEMS** 3 credits
Prerequisite: second level graduate student or permission of instructor. This course applies the epidemiological method to social work practice, such as treatment groups, making administrative decisions, in planning and evaluation, and doing preventive work.
- 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 THEATER** 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.)
- 638 LIGHTING DESIGN** 3 credits
Problems in lighting pointed towards a fundamental understanding and implementation of design for Dance, Drama, and Musical Theater. 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 play (non-American) are examined in 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
Theater history from the Greeks to the present with emphasis on physical theater, conventions, and theater 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 THEATER** 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 theater, research of specific period costume patterns, portfolio projects, and research of noted designers.
- 662 SEMINAR IN SCENT 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 theater spaces, and new scenographic materials.
- 663 SEMINAR: AMERICAN THEATER** 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.
- 682 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 or independent readings under supervision of member of theater 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 theater 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, performance or technical situation with a selected cultural organization.
- 699 MASTER'S THESIS** 1-6 credits
(May be repeated for a total of six credits) Prerequisite: permission of graduate coordinator of theater arts program. Research related to the completion of the master's thesis.

THEATER 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 THEATER STYLES** 3 credits
A detailed examination of representative plays of the contemporary theater.
- 568 CHILDREN'S THEATER** 3 credits
Study of theater 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 THEATER** 3 credits
Prerequisite: permission. A scene study course in analyzing and performing roles in American musicals. Accompanist provided.
- 590 WORKSHOP IN THEATER ARTS** 1-3 credits
(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 theater 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.
- 603 SPECIAL TOPICS IN THEATER 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 theater, 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-taught.
- 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.

THEATER 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 theater 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:**

- 509 INTERNATIONAL NURSING** *3 credits*
Prerequisite: Admission in MSN program. A comparison of nursing roles and responsibilities in an international environment. The influences of education, ethics, government, demography, and geography on health care will be considered.
- 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** *1-4 credits*
(May be repeated as new topics are presented) Selected topics in nursing. May be used to meet undergraduate/graduate requirements at the discretion of the college.
- 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: Admission to the Graduate Program. Overview of extant nursing science. Evaluation and critique of nursing conceptual models. Analysis of the relationships of theory, research, and practice.
- 605 COMPUTER APPLICATIONS IN NURSING** *2 credits*
Prerequisite: Admission to Graduate Program. Computer systems influencing nursing practice, research, education, and national knowledge exchange are examined. The complex issues surrounding their use in nursing are explored.
- 607 POLICY ISSUES IN NURSING** *2 credits*
Prerequisite: Admission to Graduate Program. Analysis of policy issues that impact on nursing and health care delivery to diverse population(s). Examine methods to shape policy, distribution, and allocation of resources.
- 608 PATHOPHYSIOLOGICAL CONCEPTS OF NURSING CARE** *3 credits*
Prerequisite: Acceptance into the M. S. N. Program. In-depth study of pathological conditions and related treatment modalities. The course focuses on specific nursing interventions related to these pathophysiological abnormalities.
- 613 NURSING INQUIRY I** *3 credits*
Prerequisite: Admission to Graduate Program. Concepts and ethical issues relating to scientific inquiry are examined, emphasizing the phases of the research process. Students participate in critical analysis of nursing research.
- 615 ADVANCED CLINICAL PRACTICE SEMINAR** *2 credits*
Prerequisite/Corequisite: 627 or 657 or 667 or 677. Discusses issues, concepts, and theories relevant to the development of advanced clinical practice roles.
- 618 NURSING INQUIRY II** *4-6 credits*
Prerequisite: 613 and permission of instructor. Emphasis on development of competencies in scientific inquiry. Research practicum will involve a) a pilot study; or b) participation in faculty research.
- 621 GERONTOLOGICAL NURSING** *3 credits*
Prerequisite/Corequisite: 603, 3100:670. Physiological, psychological, and sociological theories of aging are analyzed in relation to nursing practice and nursing research. Nursing interventions focus on promoting and maintaining function.
- 625 GERONTOLOGICAL NURSING II** *4 credits*
Prerequisite: 621; prerequisite/corequisite: 613. Major nursing care problems and psychological disabilities are analyzed. Clinical focuses on development of skills to maintain and/or restore function.
- 627 GERONTOLOGICAL NURSING III** *4 credits*
Prerequisite: 625. Examine long term care and rehabilitation in institutions, and home and community settings. Clinical experiences focus on nursing responsibilities and interventions to promote optimum care.
- 629 PRACTICUM: GERONTOLOGICAL NURSING** *3 credits*
Prerequisite: 627. Prerequisite/Corequisite: 615. Integration of nursing knowledge and skills with an older population in episodic and long term care clinical situations.
- 630 RESOURCE MANAGEMENT IN NURSING SETTINGS** *3 credits*
Prerequisite: 603, 613, 3100:670, 6200:601. Examines management of fiscal and human resources in nursing service settings; analyzes impact of economics and labor relations on health and nursing care.
- 632 FISCAL MANAGEMENT IN NURSING ADMINISTRATION** *3 credits*
Prerequisite: Admission to M.S.N. program. Examines management of fiscal resources in nursing service settings.
- 635 ORGANIZATIONAL BEHAVIOR IN NURSING SETTINGS** *3 credits*
Prerequisites: 603, 3100:670, 6200:601. Examines organizational behavior theories/principles related to systems analysis and assessment of organizational structure in nursing settings.
- 638 PRACTICUM: NURSING ADMINISTRATION I** *5 credits*
Prerequisites: 630, 632 and 635. Leadership and management theories are utilized to guide study of the role of nurse administrator.
- 639 PRACTICUM: NURSING ADMINISTRATION II** *5 credits*
Prerequisite: 638. Leadership and management theories are utilized to guide practice of the role of nurse administrator.
- 640 SCIENTIFIC COMPONENTS OF NURSE ANESTHESIA** *3 credits*
Prerequisite: Acceptance Nurse Anesthesia. Corequisite: 603. The course presents content dealing with the chemical and physical components of anesthesia agents.
- 641 PHARMACOLOGY FOR NURSE ANESTHESIA I** *3 credits*
Prerequisites: 603, 607, 640. The study of intravenous induction agents, injectable analgesics and inhaled anesthetics commonly used in the administration of general anesthesia. Includes use of muscle relaxants.

- 643 PRINCIPLES OF ANESTHESIA I** 4 credits
Prerequisite: 640. This course focuses on the acquisition of basic skills related to nursing anesthesia care and administration of anesthesia agents, with a focus on equipment.
- 644 PHARMACOLOGY FOR NURSE ANESTHESIA II** 3 credits
Prerequisite: 641. Focuses on mechanisms of drug transport within the human body for inhaled and injected medications. The effects of accessory drugs are also discussed.
- 645 PRINCIPLES OF ANESTHESIA II** 4 credits
Prerequisite: 643. Emphasis on pre-operative anesthesia care including induction techniques. Discusses airway management, fluid therapy, and ventilator use.
- 647 PROFESSIONAL ROLE SEMINAR** 2 credits
Prerequisites: 644, 645. Discusses issues, concepts and theories related to the professional role of nurse anesthetists. Focuses on leadership/management content as well as professional ethical issues.
- 649 NURSE ANESTHESIA RESIDENCY** 0 credits
Prerequisites: 644 and 645. Structured, supervised clinical experiences allowing students to apply knowledge and skills learned in the didactic portion of the nurse anesthesia curriculum.
- 651 CHILD AND ADOLESCENT HEALTH NURSING I** 3 credits
Prerequisites: 603, 3100.670. Emphasis on nursing therapeutics to decrease vulnerability and enhance positive health behavior outcomes of well children/adolescents or those with minor health disruptions in family/community contexts.
- 655 CHILD AND ADOLESCENT HEALTH NURSING II** 4 credits
Prerequisite: 651. Corequisite: 613. Emphasis on nursing therapeutics to decrease vulnerability and enhance positive health behavior outcomes of children/adolescents with acute and/or chronic health disruptions in family/community contexts.
- 656 PHARMACOLOGY FOR CHILD AND ADOLESCENT HEALTH NURSING** 3 credits
Prerequisite: Admission to Graduate Program. Emphasis on major categories of pharmacological agents, that influence developmental outcomes of children/adolescents in ambulatory, acute and chronic care environments.
- 657 CHILD AND ADOLESCENT HEALTH NURSING III** 4 credits
Prerequisite: 655. Emphasis on advanced practice role in consultation and program development/marketing related to specific developmental expectations and health behavior outcomes of children, adolescents and families.
- 659 PRACTICUM: CHILD AND ADOLESCENT HEALTH NURSING** 3 credits
Prerequisite: 657. Corequisite: 615. Integration of knowledge and skills with a specified population of children/adolescents and their families. Emphasis on implementation of programmatic intervention and evaluation.
- 661 LIAISON-COMMUNITY MENTAL HEALTH NURSING I** 3 credits
Prerequisites/Corequisites: 603, 3100.670. Focuses on the mental health of individuals experiencing stress related to actual or potential health problems. Theoretical knowledge, interviewing, and direct interventions are emphasized.
- 665 LIAISON-COMMUNITY MENTAL HEALTH NURSING II** 4 credits
Prerequisites: 661, 3100.670. Prerequisite/Corequisite: 613. Focuses on liaison mental health nursing with families experiencing the stress of actual or potential health problems. Theoretical frameworks for direct intervention are examined.
- 667 LIAISON-COMMUNITY MENTAL NURSING III** 4 credits
Prerequisite: 665. Prerequisite/Corequisite: 3100.695. Focuses on liaison mental health nursing consultation with health-care professionals. Theoretical frameworks for indirect models of intervention in non-psychiatric settings are emphasized.
- 669 PRACTICUM: LIAISON-COMMUNITY MENTAL HEALTH NURSING** 3 credits
Prerequisite: 667. Prerequisite/Corequisite: 615. Synthesis of knowledge and skill related liaison mental health nursing with specific vulnerable populations. Emphasis is on implementation of programmatic interventions and evaluation.
- 671 ADULT HEALTH NURSING I** 3 credits
Prerequisite/Corequisite: 603, 3100.670. Research and theory integral to advanced nursing practice of adults/families with selected common health problems. Emphasis on comprehensive assessment, health promotion and risk reduction.
- 672 INDEPENDENT STUDY** 1-4 credits
Opportunity for the advanced graduate nursing practice in a selected area of specialization.
- 675 ADULT HEALTH NURSING II** 4 credits
Prerequisite: 671. Prerequisite/Corequisite: 613. Focuses on problems common to acute illness in adults in acute/episodic care settings. Multidisciplinary care planning and coordination are emphasized, including transition to community-based care.
- 677 ADULT HEALTH NURSING II** 4 credits
Prerequisite: 675. Focuses on adult/family experiencing chronic illness in selected care settings. Emphasizes management of problems common to chronic care and rehabilitation.
- 679 PRACTICUM: ADULT HEALTH NURSING** 3 credits
Prerequisite: 677. Prerequisite/Corequisite: 615. Integration of knowledge and skills with a specified population of adults and their families. Emphasis on implementation of programmatic interventions and evaluation.
- 682 NURSING CURRICULUM DEVELOPMENT** 3 credits
Prerequisite: 603, 3100.670. Prerequisite/Corequisite: 625 or 655 or 665 or 675. Examines curriculum development with a focus on teaching-learning strategies. Emphasis is on process of developing a curriculum.
- 683 EVALUATION IN NURSING EDUCATION** 3 credits
Prerequisite: 682. Prerequisite/Corequisite: 625 or 655 or 675. Application of principles of evaluation and measurement to situations in nursing education. Emphasizes evaluation as a process. Includes evaluation of teacher, learner and program.
- 684 PRACTICUM: THE ACADEMIC ROLE OF THE NURSE EDUCATOR** 6 credits
Prerequisite/Corequisite: 683. Participation in a nursing program with the purpose of understanding the full professional role. Contemporary issues in nursing and higher education are examined.
- 689 MASTER'S THESIS** 1-6 credits
Prerequisite: 613. Supervised research in a specific area of advanced nursing.

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 on 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 E 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.
- 689 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.
- 731 STRESS ANALYSIS OF POLYMERS AND COMPOSITES** 2 credits
Prerequisite: 631. The design of rubber mounts, bearings and sandwich components with demonstration of finite element methods. Classical plates and shells theories with applications to composite structures.
- 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: at least one of the courses 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: 3150.313 and 3150.314 or 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 analytical 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 THESIS** 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 mulling, 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: 3140.463/563 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 initiated 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 a polymer diffusion, polymerization kinetics, polymer absorption, 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.
- 709 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** 1-3 credits
Prerequisite: permission. Topics of current interest in polymer science, encompassing chemistry, physics or technological aspects of macromolecular substances, 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 DISSERTATION** 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.



Appendix

Grievance Procedures for Graduate Students

Purpose

The procedures set forth in this document are intended to provide graduate students with a formal channel of appeal and redress of grievances arising out of their academic and/or employment relationship with the University.

Procedures

1. Any graduate student who believes that he or she has valid grounds for a complaint shall attempt to resolve the problem through a conference with the faculty member involved, the department head, and/or the graduate advisor. Following that, the student may attempt to resolve the problem with the assistance of the academic dean. A graduate student presenting a case to the academic dean must provide a full written statement of the grievance, together with all appropriate supporting material. When or if the problem has not been adequately solved at that level or the student wishes to appeal that decision, the student shall prepare a written statement of the complaint setting forth clearly and specifically the allegations and shall hand deliver the written complaint to the Dean of the Graduate School. The Dean of the Graduate School shall notify the complainant confirming the receipt of the complaint and shall request all materials from the Dean of the complainant's college.
2. Within one week of receipt of the complaint, the Dean of the Graduate School shall communicate with all parties in an attempt to informally resolve the problem. The result of this process will be a recommendation by the Dean of the Graduate School which will be communicated in writing to all parties, including the Senior Vice President and Provost.
3. The complaint shall become a grievance to be filed with the Senior Vice President and Provost if: 1) the Dean of the Graduate School wishes to have a Hearing Committee render a recommendation on the grievance; or 2) the student wishes to appeal the recommendation of the Dean of the Graduate School. The student must notify the Senior Vice President and Provost in writing within one week of notification of the Dean of the Graduate School's decision on the complaint.
4. Upon receipt of the grievance, the Senior Vice President and Provost shall notify in writing the President of Graduate Student Government that a Hearing Committee should be constituted. The Hearing Committee shall be organized in no more than two weeks.
5. When the grievance has been filed with the Chairperson of the Hearing Committee, it shall be the responsibility of that Chairperson to notify in writing all parties involved in the grievance within two working days. This notification shall include the following information: that a grievance has been filed; the nature of the grievance; and the parties involved.
6. If the charged party in that grievance admits the validity of the grievance, the Chairperson of the Hearing Committee shall waive the hearing and shall direct an appropriate resolution in consultation with the Hearing Committee.
7. If the party charged in the grievance denies the validity of the grievance, the Hearing Committee shall conduct the hearing.

Hearing Committee

A Hearing Committee shall be established as follows:

1. **Chairperson** – The Chairperson shall be a member of the graduate faculty with full membership, but not from a department involved in the proceedings. This Chairperson shall be selected by the Senior Vice President and Provost and shall serve for only one grievance proceeding. The Chairperson shall conduct the hearing and shall vote only in the case of a tie.
2. **Members** – Four members shall be selected as follows:
 - a. From the complainant's department – a graduate student not directly involved, selected jointly by the Department Head and the President of the Graduate Student Government. If the grievance is filed against the Department Head, the Academic Dean shall substitute for the Department head. If the grievance is filed against the department, the Senior Vice President and Provost shall substitute for the Department Head.
 - b. From the complainant's department – a faculty member not directly involved, selected jointly by the Department Head and the President of the Graduate Student Government. If the grievance is filed against the Department Head, the Academic Dean shall substitute for the Department Head. If the grievance is filed against the department, the Senior Vice President and Provost shall substitute for the Department Head.
 - c. A graduate student not involved with the complainant and not from the complainant's department, selected by the Vice Chairperson of the Graduate Council.

d. a member of the graduate faculty with full membership not involved in the complaint nor from the complainant's department, selected by the Senior Vice President and Provost.

3. A Hearing Committee shall be organized anew each and every time a grievance is brought forth. A Hearing Committee shall serve through the adjudication and resolution of the complaint.

Hearing Procedure

1. The hearing must take place within two weeks of the Hearing Committee's formation.
2. At least three working days prior to the hearing, the Hearing Committee Chairperson shall provide the Hearing Committee and the Parties involved with:
 - a. The student's written statement of the grievance.
 - b. Written notification of when and where the Hearing Committee shall meet.
 - c. A copy of "Grievance Procedures for Graduate Students" and all relevant documents.
3. Each party shall be required to appear in person before the Hearing Committee to present his/her case. Each party may have an advisory/colleague present to protect his/her rights if so desired. However, the parties shall speak and act on their own behalf. Witnesses may be called to present evidence on behalf of the complainant or the charged person. The use of tape recorders is prohibited, except as may be required to accommodate persons with disabilities.
4. All parties shall be entitled to an expeditious hearing. In urgent cases in which it is alleged that a regulation, administration decision, or action threatens immediate and irreparable harm to any of the parties involved, the Hearing Committee shall expedite the hearing and disposition of the case. The Hearing Committee is empowered to recommend to the Dean of the Graduate School that an individual, department, or college discontinue or postpone any action which threatens to cause irreparable harm, pending the final disposition of the case.
5. The burden of proof shall be on the complainant and the standards of justice and fair play shall prevail in the adjudication of violations and grievances.
6. If necessary, the Hearing Committee may consult with the University's Office of General Counsel for advice at any time throughout this process.

Decisions and Actions

1. The Hearing Committee shall decide as follows: there has been a violation of the complainant's rights, or there has been no violation of the complainant's rights.
2. Should the Hearing Committee determine that a violation of the complainant's rights occurred, the Committee shall, if practical, recommend a resolution to the Senior Vice President and Provost.
3. The Senior Vice President and Provost, exercising his/her judgment, shall act on the implementation of the resolution recommended by the Hearing Committee.

Record Keeping

The Chairperson of the Hearing Committee shall be responsible for keeping a summarized, written record of all the proceedings.

1. Records of all proceedings shall be prepared by the secretarial personnel of the Graduate School. Copies of all proceedings shall be distributed as follows:
 - a. To all parties involved in the proceedings.
 - b. To the Hearing Committee members.
 - c. To the President of the Graduate Student Government.
 - d. To the Dean of the Graduate School.
 - e. To the Senior Vice President and Provost.
2. A copy of all proceedings shall be kept in the office of the Dean of the Graduate School pursuant to the University's record retention proposal.

Appeal

An appeal may be made to the President of the University after all of the above procedures have been followed. The President of the University shall assess each case on an individual basis and his/her decision shall be considered final.

Approved by Student Policy Committee, 2/2/93

Approved by Graduate Council, 3/29/93

Approved by Graduate Faculty, 4/22/93

Approved by the Academic Policies, Curriculum and Calendar Committee, 3/15/94

Approved by the Board of Trustees, 6/22/94

Intellectual Property Rights and Obligations

During your graduate study at The University of Akron and your professional career thereafter, you may become involved with at least one of the three main forms of intellectual property matters: copyrights, patents, and proprietary information/trade secrets. It is possible that certain discoveries may have commercial value, and therefore may invoke one or more of the above forms of intellectual property ownership.

Copyright

Copyright, by law, is automatically owned by the author when the work is placed in a fixed form (or medium). The University Board of Trustees automatically waives any claim of the University to copyright in books, texts, or articles authored by faculty or students except when the material is prepared as a sponsored project in which case it is the property of the University. Ownership would then be assigned to the University or its designee as the Board of Trustees directs. Questions of authorship are often best handled informally between potential joint authors.

Patents

All discoveries and inventions in any way related to your research work at The University of Akron must be reported to your faculty advisor, and through your advisor to your department chair, dean, and thereafter to the Office of Research Services and Sponsored Programs using the standard University of Akron invention disclosure form. This form provides a guide to describing and identifying the invention broadly and referencing specific results. Those persons thought to be possible inventors should also be identified on this form.

Patents on inventions made by University faculty, staff, students or anyone using University facilities are automatically owned by The University of Akron, as provided by Ohio Revised Code Section 3345.14. The final decision as to inventorship is a technical legal conclusion and will be made in the course of preparing a patent application by the patent attorney handling the application.

Proprietary Information

Those engaged in sponsored research may also be involved with developing or receiving proprietary information owned by others outside the University (e.g., sponsors such as corporations and individuals seeking certain research from the University). The University and the principal investigator may have agreed to maintain this proprietary information in confidence. In some situations, proprietary information of a sponsor may be provided to you or other project investigators during a research project. The sponsor desires, in these situations, to keep the information confidential (or secret) for as long as possible.

You are free to use the confidential information in the course of the project and discuss it with other students or faculty members engaged in that project. **However, you may not use the information on other projects, nor may you discuss it with other individuals not involved with that project.** While these commitments could delay public access to your thesis for a specified time, it will not delay acceptance or approval of your thesis/dissertation nor delay your graduation date.

The University and principal investigator must have written personal commitments from anyone working on a project involving and securing proprietary information. Therefore, all research students are required to execute the Confidentiality Agreement (sample form attached to this page). Prior to the start of your research, it is the responsibility of the research director to inform you in writing of any restrictions on the research with a copy also sent to the Office of Research Services and Sponsored Programs, if your research is subject to confidentiality provisions. You are also to be informed by the research director about the scope of the research that is covered by any confidentiality provisions.

If you have any questions as to what information is proprietary, seek guidance from your project's principal investigator or your faculty research advisor.

Questions of Authorship and Inventorship

In the event you think you have been improperly omitted from the list of authors, you should first discuss the matter with your faculty advisor. If you have further questions or consider the matter unresolved, you should inform in the following order the appropriate department chair, the college dean, and finally the Dean of the Graduate School. (Questions are usually, and most quickly, resolved at the lowest administrative levels.)

In the event you think you have been omitted as an inventor on a patent application, you should first discuss the matter with your faculty research advisor and, thereafter, with your department chair and finally with your academic dean. Following such consultations, either you and/or your faculty advisor, or your department chair, or your dean can request the patent attorney who prepared the application to recheck the findings and then prepare a formal report on inventorship. The whole patent application file may then be referred to the Office of General Counsel for a re-evaluation of valid inventors. However such as re-evaluation by patent counsel shall only occur with the prior knowledge of your faculty advisor, Department Chair and Dean.

(Sample)

THE UNIVERSITY OF AKRON INVENTION PATENT AGREEMENT

Name: _____
Last First Middle Initial

Social Security No.: _____

The University of Akron graduate students are required to sign this form as a condition of being permitted to participate in any research activity at the University.

1. As a condition of and in consideration of my participating in sponsored research or other financially supported activity at The University of Akron, I hereby agree to communicate fully with my Faculty Advisor, including discussing the details of any work conducted by me and the results which flow therefrom. I recognize that this communication is essential as it relates to any sponsored research, to any course and thesis/dissertation research, and to my safety and the safety of everyone else using the same facility that I use.

2. I further agree to disclose promptly to the director of the research and to my Faculty Research Advisor any invention conceived and/or reduced to practice by me whether jointly with others or solely, which results in whole or in part from such sponsored research or financially supported activity. I agree that I will comply with the provisions of any agreement between The University of Akron and any sponsor for any information and laboratory practice to which I am privileged to know. I will cooperate in assuring that the sponsor's rights, including rights in inventions, patents, copyrights, are fully protected. Further, I hereby assign all rights, title and interest to The University of Akron for its disposal at its sole discretion.

3. I also acknowledge that certain technical information that may arise as a result of the sponsored research or supported activity may be of a confidential nature. I agree to be bound to the reasonable terms of any nondisclosure agreement as it has been agreed to by the University.

4. Finally, I acknowledge and agree that any rights which arise as a result of the sponsored research or supported activity belong to The University of Akron or to the sponsor as determined by agreement between The University of Akron and the sponsor.

Date

Student's Signature



Directory

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Graduate Council

September 1995

- CHARLES M. DYE**, Ph.D., *Interim Dean of the Graduate School, Chair*

Term expires August 31, 1996

- DIANA C. REEP**, Ph.D., *College of Arts and Sciences: Humanities*
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M. KAY ALDERMAN, Ed.D., *College of Education*
T.S. SRIVATSAN, Ph.D., *College of Engineering*
KAREN REED, Ph.D., *College of Nursing*
PAMELA TOLLIVER, *President, Graduate Student Government*

Term expires August 31, 1997

- TED ALLEN CONWAY**, Ph.D., *College of Engineering*
GARY R. HAMED, Ph.D., *College of Polymer Science and Polymer Engineering*
JAMES M. LYNN, Ph.D., *College of Fine and Applied Arts*
GAY C. KITSON, Ph.D., *College of Arts and Sciences: Social Sciences*

Term expires August 31, 1998

- THOMAS G. CALDERON**, Ph.D., *College of Business Administration*
PHILLIP H. SCHMIDT, Ph.D., *College of Arts and Sciences: Natural Sciences*
THERESE L. LUECK, Ph.D., *College of Fine and Applied Arts*
SUSAN J. OLSON, Ph.D., *College of Education*
WILLIAM I. MILLER, Ph.D., *College of Arts and Sciences: At-Large*

Graduate Faculty*

September 1995

- PEGGY GORDON ELLIOTT**, *President of the University; Professor of Education; Harrington Distinguished Chair in the College of Education* (August 1992) B.A., Transylvania College; M.S., Northwestern University; Ed.D., Indiana University, 1975.
ABDULLAH ABONAMAH, *Associate Professor of Mathematical Sciences* (1989) B.S., University of Dayton; M.S., Wright State University; Ph.D., Illinois Institute of Technology, 1986.
STEPHEN H. ABY, *Education Bibliographer; Assistant Professor of Bibliography* (August 1988) B.A., University of Texas at Austin; M.A., University of Houston; Ph.D., State University of New York at Buffalo; M.L.S., Kent State University, 1984.
CAROLYN A. ALBANESE, *Associate Professor of Home Economics and Family Ecology* (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 at Austin; Ed.D., University of Houston, 1976.
TANA F. ALEXANDER, *Associate Professor of Music* (1978) B.M., The Ohio State University, M.M., University of Louisville, 1974.
REENE A. ALLEY, *Associate Professor of Education* (1989) B.S., Ball State University; M.A., Purdue University; Ed.D., Indiana University, 1981.
ALFRED L. ANDERSON, *Professor of Music* (1985) B.M.E., Mississippi College; M.M., Indiana University, 1970.
ALLEN S. ANDERSON, *Assistant Professor of Finance* (1984) B.S.C.E., B.B.A., M.B.A., Texas A&M University; Ph.D., University of Arkansas, 1978.
WILLIAM B. ARBUCKLE, *Associate Professor of Civil Engineering* (July 1982) B.S.Ch.E., Ohio University; M.S.E.E., Ph.D., University of North Carolina, 1975.
STEPHEN ARON, *Associate Professor of Music* (1981) B.M., University of Hartford, M.M., University of Arizona, 1981.
MARK S. AUBURN, *Interim Director of the School of Theatre Arts; Professor of English* (July 1991) B.S., B.A., The University of Akron; M.A., Ph.D., University of Chicago, 1971.
KENNETH E. AUPPERLE, *Professor of Management* (1986) B.A., M.A., Western Michigan University; M.B.A., Kansas State University; Ph.D., University of Georgia, 1982.
JAMES F. AUSTIN, *Associate Professor of Education; Coordinator of School Psychology* (1987) B.A., M.A., Ph.D., Case Western Reserve University, 1971.
ROGER J. BAIN, *Professor of Geology; Department Chair of Geology* (1970) B.S., M.S., University of Wisconsin; Ph.D., Brigham Young University, 1968.
J. WAYNE BAKER, *Professor of History; General Studies Course Director: Western Cultural Traditions* (1968) B.A., Western Baptist College; B.D., Talbot Theological Seminary; B.A., Pepperdine University; M.A., Ph.D., University of Iowa, 1970.
PHILIP R. BALDWIN, *Associate Professor of Physics; Associate Professor of Chemistry; Associate Professor of Mathematical Sciences; Associate Professor Mechanical Engineering* (1990) B.A., Princeton University; Ph.D., University of Illinois at Urbana, 1987.
DANNY L. BALFOUR, *Associate Professor of Public Administration and Urban Studies* (1990) B.A., Michigan State University; Ph.D., Florida State University, 1990.
SHELLEY O. BARANOWSKI, *Professor of History* (1989) B.A., Wells College; M.A., Ph.D., Princeton University, 1980.
GERALD V. BARRETT, *Professor of Psychology* (1973) B.A., Wittenberg University; M.S., Ph.D., Case Western Reserve University; J.D., The University of Akron, 1985.
ABEL A. BARTLEY, *Assistant Professor of History* (1994) B.A., M.A., Ph.D., Florida State University, 1994.
ONKER N. BASU, *Assistant Professor of Accounting* (1991) B.Com., M.M.S., University of Bombay; Ph.D., Pennsylvania State University, 1992.
CELAL BATUR, *Professor of Mechanical Engineering* (February 1980) B.Sc., M.Sc., The Technical University of Istanbul; Ph.D., The University of Leicester, 1976.
JOAN E. BAUMGARDNER, *Assistant Professor of Nursing; Coordinator of Senior Year* (1979) B.S.N., M.S.N., The Ohio State University; Ph.D., The University of Akron, 1988.
JOHN D. BEE, *Professor of Communication; Director of the School of Communication; General Studies Course Director: Speech; Director of Instructional Delivery Systems* (1969) B.A., Ohio University; M.A., Ph.D., University of Wisconsin at Madison, 1972.
JUTTA T. BENDREMER, *Assistant Professor of English* (1967) B.A., Hunter College, M.A., Brooklyn College, 1951.
RODNEY B. BENGSTON, *Director of University Galleries* (February 1992) B.A., Allegheny College; M.F.A., Kent State University, 1982.
DAVID S. BERNSTEIN, *Professor of Music* (1972) B.M., M.M., Florida State University; D.M., Indiana University at Bloomington, 1974.
WILLIAM H. BEYER, *Acting Associate Vice President for Administrative Support Services; Professor of Mathematical Sciences* (1961) B.S., The University of Akron; M.S., Ph.D., Virginia Polytechnic Institute, 1961.
CLIFFORD G. BILLIONS, *Professor of Music* (1978) B.M., Oklahoma Baptist University; M.M., Converse College, 1971.
WISLAW K. BINIENDA, *Associate Professor of Civil Engineering* (1988) M.S., Warsaw Technical University; M.S.M.E., Ph.D., Drexel University, 1988.
ERIC R. BIRDSALL, *Professor of English* (June 1987) B.A., California State University; M.A., Ph.D., The Johns Hopkins University, 1976.
ALAN K. BODMAN, *Professor of Music* (1986) B.M., Michigan State University; M.M., University of Michigan, 1973.
DALE S. BOROWIAK, *Professor of Mathematical Sciences* (1980) B.S., M.S., The University of Akron; Ph.D., Bowling Green State University, 1980.
CONSTANCE B. BOUCHARD, *Professor of History* (August 1990) B.A., Middlebury College; M.A., Ph.D., University of Chicago, 1976.
DOLORES A. BOWER, *Professor of Nursing; Associate Dean of the Graduate Program-Nursing* (1983) B.S., University of Rhode Island; M.S.N., Boston University; Ph.D., Kent State University, 1983.
LARRY G. BRADLEY, *Associate Dean of the College of Education; Professor of Education* (1969) B.A., Muskingum College; M.A., West Virginia University; Ph.D., Ohio University, 1969.

* The dates in parentheses indicate the beginning of service at The University of Akron; unless otherwise stated, service began in the month of September.

- IRVIN W. BRANDEL**, Director of the Counseling and Testing Center; Adjunct Associate Professor of Home Economics and Family Ecology (July 1969) B.S., Bowling Green State University; M.A., Michigan State University; Ph.D., The University of Akron, 1975.
- SALLY M. BRANDEL**, Director of Student Assistance Center; Counseling Psychologist (1981) B.S., Indiana University; M.S., Ph.D., The University of Akron, 1979.
- WILLIAM T. BRANDY**, Associate Professor of Communicative Disorders (August 1990) A.B., Heidelberg College; M.S., University of Pittsburgh; Ph.D., University of Oklahoma, 1969.
- MINEL J. BRAUN**, Professor of Mechanical Engineering (1978) M.S., Ph.D., Carnegie-Mellon University, 1978.
- MERLIN G. BRINER**, Professor of Law (1970) B.S.B.A., Wichita State University; J.D., The University of Akron, 1966.
- WILLIAM J. BRITAIN**, Associate Professor of Polymer Science (August 1990) B.S., University of Northern Colorado; Ph.D., California Institute of Technology, 1962.
- STEPHEN C. BROOKS**, Associate Director of the Ray C. Bliss Institute; Associate Professor of Political Science (1982) B.A., Colorado College; M.A., Ph.D., Northwestern University, 1982.
- DIANNE BROWN-WRIGHT**, Assistant Professor of Education (1991) B.A., M.S., Ph.D., Florida State University, 1984.
- KEITH L. BRYANT, JR.**, Professor of History (August 1988) B.S., M.Ed., University of Oklahoma; Ph.D., University of Missouri, 1965.
- JAMES H. BUCHANAN**, Associate Professor of Philosophy (1971) B.A., M.A., Ohio University; Ph.D., Pennsylvania State University, 1970.
- DAVID C. BUCHTHAL**, Professor of Mathematical Sciences; Department Chair of Mathematical Sciences (1971) B.S., Loyola University; M.S., Ph.D., Purdue University, 1971.
- JULIA R. BURDGE**, Assistant Professor of Chemistry (1994) B.A., M.S., University of South Florida; Ph.D., University of Idaho, 1994.
- TERRY F. BUSS**, Professor of Public Administration and Urban Studies; Department Chair of Public Administration and Urban Studies (1987) B.A., M.A., Ph.D., The Ohio State University, 1976.
- DENNIS M. BYRNE**, Professor of Economics (1975) B.S., Villanova University; M.A., Ph.D., University of Notre Dame, 1975.
- ALLEN MANUEL CABRAL**, Associate Professor of Accounting (1972) B.S.B.A., American International College; M.S., Kent State University; J.D., The University of Akron; L.L.M., Cleveland State University, 1985; C.P.A., Ohio.
- KYONSUKU MIN-CAKMAK**, Associate Professor of Polymer Engineering (August 1983) B.Eng., M.Eng., Kyoto Institute of Technology; Ph.D., University of Tennessee, 1984.
- MUKERREM CAKMAK**, Professor of Polymer Engineering (August 1983) B.S., Technical University of Istanbul; M.S., Ph.D., University of Tennessee, 1984.
- THOMAS G. CALDERON**, Associate Professor of Accounting (1988) B.S., M.S., University of the West Indies; Ph.D., Virginia Polytechnic Institute and State University, 1987.
- KIM C. CALVO**, Professor of Chemistry (1984) B.A., Ph.D., The Ohio State University, 1981.
- DOUGLAS E. CAMERON**, Professor of Mathematical Sciences (1969) B.A., Miami University; M.S., The University of Akron; Ph.D., Virginia Polytechnic Institute and State University, 1970.
- JANIS M. CAMPBELL**, Associate Professor of Nursing (August 1988) B.S.N., M.S.N., Ph.D., The Ohio State University, 1978.
- FRANCIS E. CANDA**, Assistant Professor of Finance (August 1989) B.A., John Carroll University; M.B.A., Kent State University; Ph.D., The Ohio State University, 1991.
- RICHARD E. CAPLAN**, Associate Professor of Communication (1980) B.A., Michigan State University; M.A., Ph.D., Wayne State University, 1975.
- FRED M. CARR**, Assistant Professor of Education; Director of the Center for Economic Education; (October 1979) B.A., Westminster College; M.Ed., Ed.S., Ph.D., University of Florida, 1977.
- CHARLES H. CARTER**, Professor of Geology (1982) B.S., Portland State University; M.S., San Jose State University; Ph.D., Johns Hopkins University, 1972.
- JOSEPH F. CECCIO**, Professor of English (1978) B.A., Loyola College; M.A., Ph.D., University of Illinois at Urbana, 1975.
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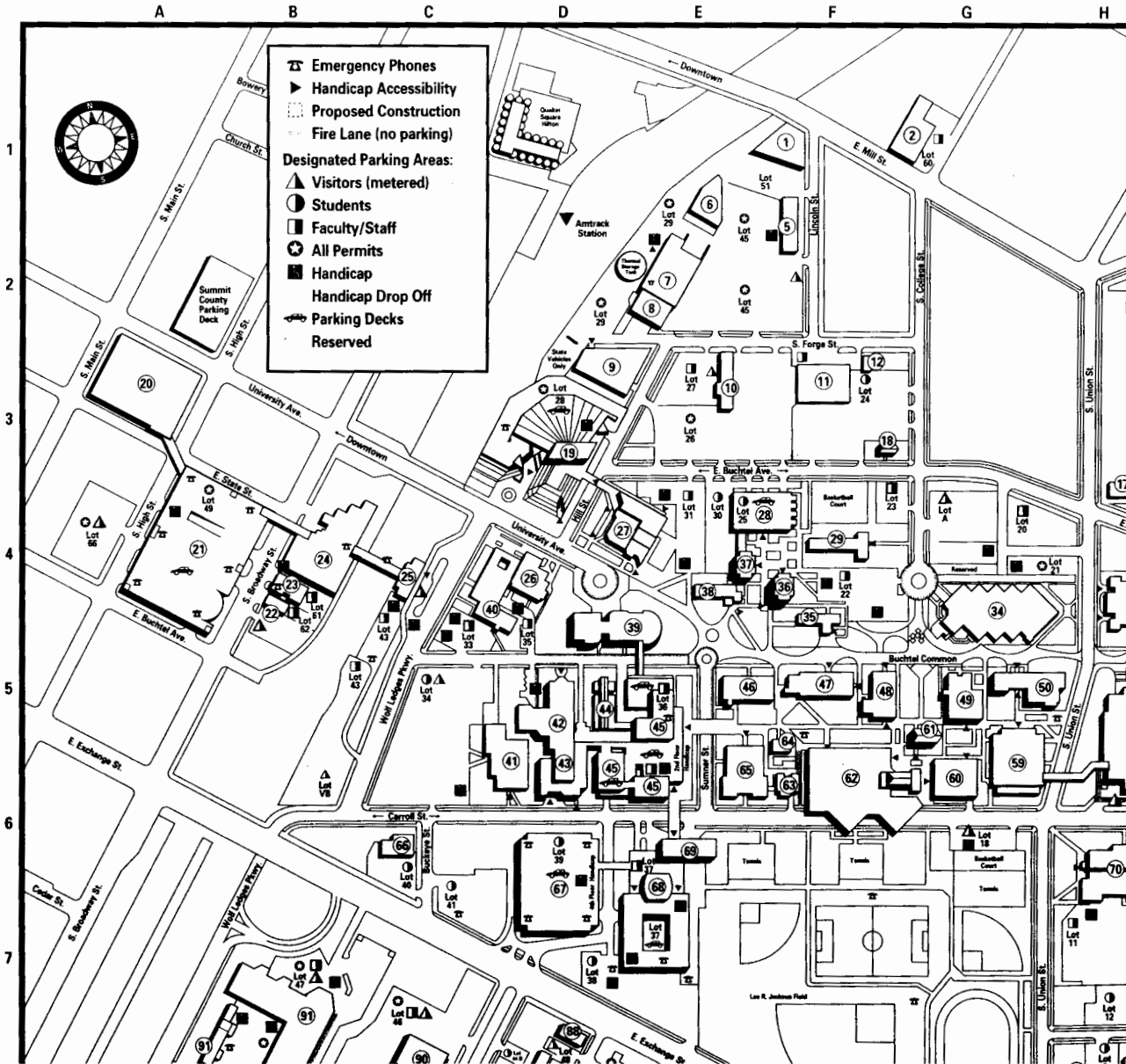
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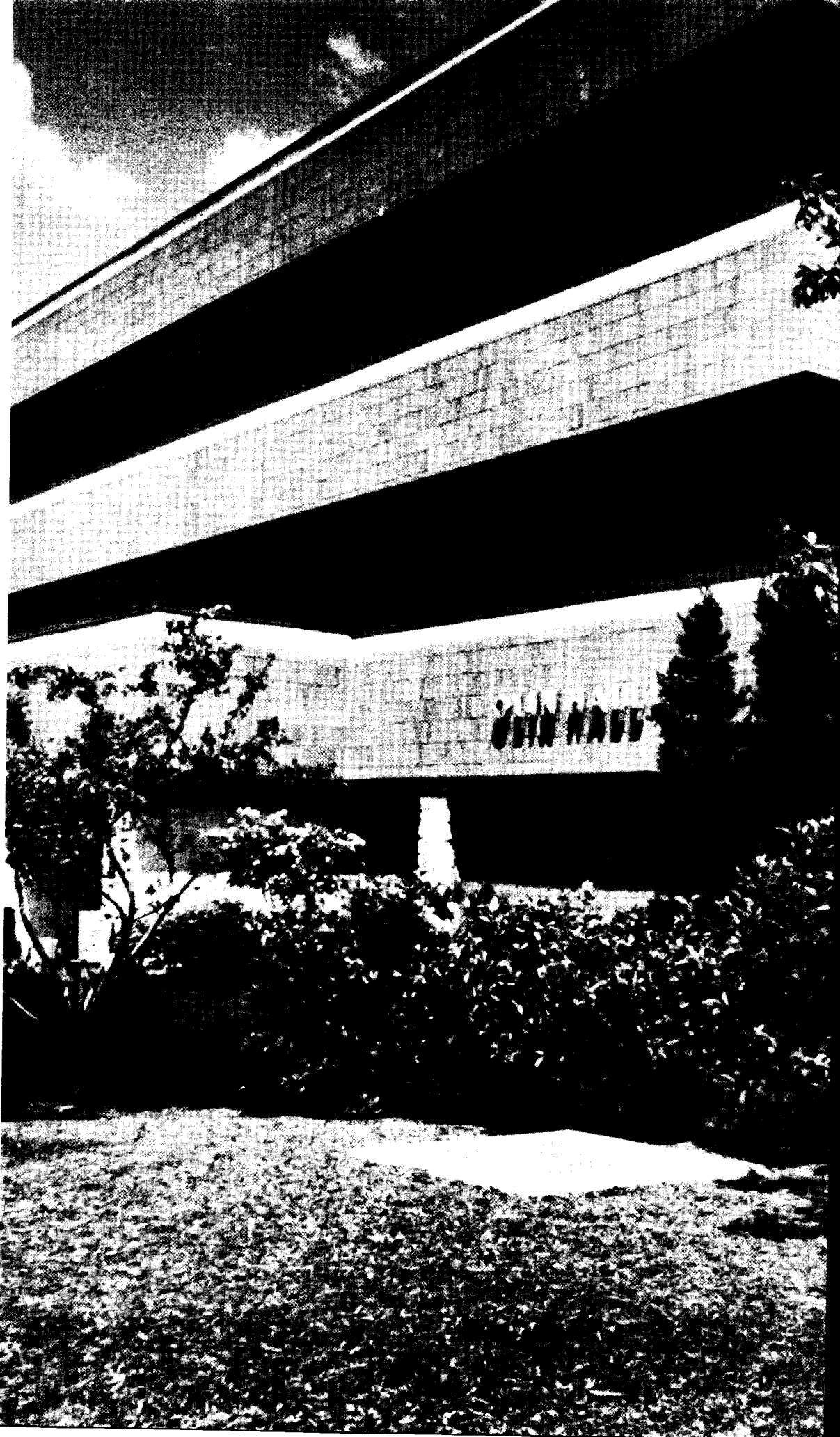
Campus Map



- | | | |
|----|----|--|
| E5 | 44 | Academic Buildings |
| G1 | 2 | Auburn Science and Engineering Center |
| E5 | 45 | Akron Polymer Training Center |
| I1 | 3 | Ayer Hall |
| G5 | 33 | Baller Center |
| G6 | 59 | Bierce Library |
| B4 | 23 | Carroll Hall |
| F5 | 46 | College of Business Administration Building |
| B8 | 90 | Crouse Hall |
| F3 | 12 | Folk Hall |
| D6 | 42 | Forge Building |
| D4 | 26 | Gladwin Hall |
| D5 | 41 | Guzzetta Hall |
| H5 | 49 | Knight Chemical Laboratory |
| H5 | 48 | Kolbe Hall |
| D4 | 25 | Leigh Hall |
| H4 | 32 | McDowell Law Center |
| E2 | 7 | Olin Hall |
| A3 | 20 | Olson Research Center |
| E5 | 38 | The Polsky Building |
| E6 | 67 | Polymer Science Building |
| E7 | 66 | Schrank Hall North |
| E6 | 64 | Schrank Hall South |
| C4 | 39 | Simmons Hall |
| D5 | 43 | West Hall |
| F5 | 47 | Whitby Hall |
| | | Zook Hall |
| I5 | 31 | Administrative Buildings |
| F1 | 1 | Admissions Building |
| F6 | 62 | Bel-Aire Building |
| B4 | 21 | Boiler and Heating Plant |
| B4 | 22 | 285 South Broadway Street Building |
| G5 | 60 | 277 South Broadway Street Building |
| C6 | 65 | Buchtel Hall |
| F3 | 11 | Carroll Street Substation |
| D6 | 40 | Central Services Building |
| D7 | 87 | Computer Center |
| E8 | 86 | 222 Exchange Building |
| I4 | 29 | 232 Exchange Building |
| E2 | 8 | 138 Fir Hill Street |
| E1 | 6 | Forge Street Substation |
| F2 | 5 | Grounds Maintenance |
| E3 | 10 | 100 Lincoln Street Building |
| D3 | 9 | North Hall |
| H6 | 68 | Physical Facilities Operations Center |
| H4 | 17 | Spicer Hall |
| | | 143 Union Street Building |
| C4 | 24 | Multi-purpose Buildings |
| I3 | 14 | Buckingham Building |
| F5 | 63 | Center for Child Development |
| F6 | 61 | Computer Store |
| F4 | 27 | Gardner Student Center |
| I2 | 4 | Health Services |
| J3 | 15 | Hower House |
| G6 | 58 | Martin University Center |
| I7 | 89 | Memorial Hall |
| H6 | 57 | Oasek Natatorium |
| F4 | 27 | James A. Rhodes Health and Physical Education Building |
| D3 | 19 | Roberson Dining Hall |
| | | E.J. Thomas Performing Arts Hall |

- | | | |
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| J6 | 71 | Alpha Gamma Delta Sorority |
| F3 | 18 | Alpha Kappa Alpha Sorority |
| I6 | 55 | Alpha Phi Sorority |
| K7 | 79 | Batrick Hall |
| H8 | 84 | Berns Residence Hall* |
| F4 | 35 | Brown Street Residence Hall |
| J7 | 77 | Bulger Residence Hall |
| D9 | 92 | Chi Omega Sorority |
| I5 | 51 | Concord Residence Hall* |
| K5 | 30 | Delta Gamma Sorority |
| D9 | 94 | Delta Tau Delta Fraternity |
| C8 | 89 | Ellis House* |
| E9 | 96 | Gallucci Residence Hall (Honors Program) |
| K7 | 75 | Garson Residence Hall |
| C9 | 91 | Glenville Residence Hall* |
| H8 | 83 | Grant Residence Center |
| D9 | 97 | High-rise |
| J7 | 72 | Joey Residence Hall* |
| I3 | 13 | Judson House* |
| F4 | 28 | Kappa Kappa Gamma Sorority |
| J5 | 54 | Lambda Chi Alpha Fraternity |
| J7 | 76 | Orr Residence Hall |
| K5 | 52 | Phi Delta Theta Fraternity |
| I5 | 50 | Phi Gamma Delta Fraternity |
| K6 | 74 | Phi Kappa Psi Fraternity |
| J8 | 80 | Phi Kappa Tau Fraternity |
| F5 | 34 | Phi Sigma Kappa Fraternity |
| D9 | 93 | Pi Kappa Epsilon (Lone Star) Fraternity |
| I9 | 99 | Ritchie Residence Hall |
| J6 | 73 | Sherman Residence Hall* |
| I9 | 98 | Sigma Alpha Epsilon Fraternity |
| I6 | 56 | Sigma Nu Fraternity |
| E4 | 37 | Sigma Pi Fraternity |
| E4 | 36 | Sigma Tau Gamma Fraternity |
| D9 | 95 | Sister/McFawn Residence Hall |
| I3 | 16 | Spanton Residence Hall |
| J7 | 78 | Summer Residence Hall* |
| D8 | 88 | Tau Kappa Epsilon Fraternity |
| K5 | 53 | Theta Chi Fraternity |
| H8 | 85 | Town Houses (East Crown) |
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* Privately owned residence halls



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The *Graduate Bulletin* is published once each year by
The University of Akron Graduate School
The Polsky Building, 467D
