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THE
UNIVERSITY
OF
DAYTON
BULLETIN

Graduate Issue
January 1994



The University of Dayton



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The University of Dayton Bulletin includes Graduate Issue, Summer Session Issue, Fall Session Issue, School of Law Issue, and Undergraduate Issue.

The provisions of the various issues of this Bulletin are to be considered directive in character and not as an irrevocable contract between the student and the University. The University reserves the right to make any changes that seem necessary or desirable.

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1993-1994 ACADEMIC CALENDAR

FIRST TERM

Sat.-Tue., Aug. 21-24	New Student Orientation
Tue., Aug. 24	Last day to complete registration
Tue., Aug. 24	New Student Convocation
Wed., Aug. 25	Classes begin at 8:00 a.m.
Thu., Sept. 2	Last day for late registration, change of grading options and schedules
Fri., Sept. 3	Last day to change Third Term and second session grades
Mon., Sept. 6	Labor Day—no classes
Fri., Sept. 10	General Faculty Meeting at 3:00 p.m.
Wed., Sept. 15	Last day to withdraw without record
Fri.-Sun., Sept. 24-26	Parents' Weekend
Tue., Sept. 28	Last day to submit candidacy for graduation in December
Mon., Oct. 11	Columbus Day—no classes except those held once weekly at 4:30 p.m. and after Homecoming
Fri.-Sun., Oct. 15-17	Homecoming
Mon., Oct. 18	First-year students' midterm progress grades due in Registrar's Office by 4:00 p.m.
Wed.-Fri., Oct. 20-22	Winter 1993-94 registration for seniors
Mon.-Fri., Oct. 25-29	Winter 1993-94 registration for juniors
Mon., Nov. 1	All Saints Day—no classes except those held once weekly at 4:30 p.m. and after
Tue.-Thu., Nov. 2-18	Winter 1993-94 registration for sophomores
Fri.-Sun., Nov. 5-7	Parents' Weekend
Fri., Nov. 12	Last day to withdraw with record of W
Fri., Nov. 19	General Faculty Meeting at 3:00 p.m.
Fri.-Mon., Nov. 19-Dec. 6	Winter 1993-94 registration for first-year students
Wed., Nov. 24	Thanksgiving recess begins after last evening class
Sat., Nov. 27	Graduate Saturday classes meet
Mon., Nov. 29	All classes resume
Tue., Dec. 7	Last day of classes—all Monday classes will be held on Tuesday, Dec. 7 (8 a.m.-4:15 p.m.)
Wed., Dec. 8	Feast of Immaculate Conception—Christmas on Campus
Thu., Dec. 9	Study day—Faculty Development Day
Fri.-Thu., Dec. 10-16	Examinations
Wed., Dec. 15	Senior grades due
Thu., Dec. 16	First Term ends after final examinations
Sat., Dec. 18	Diploma Exercises
Mon., Dec. 20	Grades due in Registrar's Office at 9:00 a.m.

SECOND TERM

Tue., Jan. 4	Last day to complete registration
Wed., Jan. 5	Classes begin at 8:00 a.m.
Thu., Jan. 13	Last day for late registration, change of grading options and schedules
Mon., Jan. 17	Martin Luther King Jr. Day—no classes except those held once weekly 4:30 p.m. and after
Wed., Jan. 26	Last day to withdraw without record
Fri., Jan. 28	Last day to change First Term grades
Fri., Jan. 28	General Faculty Meeting at 3:00 p.m.
Mon., Feb. 7	Last day to submit candidacy for graduation in May
Mon., Feb. 21	Presidents' Day—no classes except those held once weekly 4:30 p.m. and after
Fri., Feb. 25	First-year students' midterm progress grades due in Registrar's Office by 4:00 p.m.
Fri., Mar. 11	Spring Break begins after last class
Mon., Mar. 21	Classes resume at 8:00 a.m.

Tue.-Thu., Mar. 22-24	Fall 1994-95 registration for seniors
Fri., Mar. 25	Last day to withdraw with record of W
Mon.-Fri., Mar. 28-Apr. 8	Fall 1994-95 registration for juniors
Thu., Mar. 31	Easter recess begins after last evening class
Tue., Apr. 5	Classes resume at 8:00 a.m.
Fri., Apr. 8	General Faculty Meeting at 3:00 p.m.
Mon.-Fri., Apr. 11-22	Fall 1994-95 registration for sophomores and first-year students
Tue., Apr. 26	Last day of classes—all Monday classes will be held on Tuesday, April 26 (8:00 a.m.-4:15 p.m.)
Wed., Apr. 27	Study Day
Thu.-Wed., Apr. 28-May 4	Examinations
Wed., May 4	Senior grades due—Second Term ends after final examinations
Sun., May 8	Commencement
Mon., May 9	Grades due in Registrar's Office at 9:00 a.m.

THIRD TERM — FIRST SESSION

Thu., May 12	Last day to complete registration
Fri., May 13	Classes begin at 8:00 a.m.
Wed., May 18	Last day for late registration, change of grading options and schedules
Tue., May 24	Last day to withdraw without record from first session courses
Mon., May 30	Memorial Day—no classes
Fri., Jun. 3	Last day to withdraw without record from full Third Term courses
Wed., Jun. 8	Last day to change Second Term grades
Thu., Jun. 9	Last day to withdraw with record of W from first session courses
Wed., Jun. 22	Last day of classes
Thu.-Sat., Jun. 23-25	Examinations
Sat., Jun. 25	First session ends after final examinations
Mon., Jun. 27	Grades due in Registrar's Office at 9:00 a.m.

THIRD TERM — SECOND SESSION

Fri., Jun. 24	Last day to complete registration
Mon., Jun. 27	Classes begin at 8:00 a.m.
Thu., Jun. 30	Last day for late registration, change of grading options and schedules
Fri., Jul. 1	Last day to submit candidacy for graduation in August
Mon., Jul. 4	Independence Day—no classes
Thu., Jul. 7	Last day to withdraw without record from second session courses
Mon., Jul. 25	Last day to withdraw with record of W from second session and full third term courses
Fri., Jul. 29	Last day to change first session grades
Thu., Aug. 4	Last day of classes
Fri.-Sat., Aug. 5-6	Examinations
Fri., Aug. 5	Senior grades due
Sat., Aug. 6	Second session ends after final examinations
Sun., Aug. 7	Diploma Exercises
Mon., Aug. 8	Grades due in Registrar's Office at 9:00 a.m.
Fri., Sept. 9	Last day to change second session grades

1994-1995 ACADEMIC CALENDAR

FIRST TERM

Sat.-Tue., Aug.20-23	New Student Orientation
Wed., Aug. 24	Classes begin at 8:00 a.m.
Mon., Sept. 5	Labor Day—no classes
Mon., Oct. 10	Columbus Day—no classes
Tues., Nov. 1	All Saints Day—no classes
Wed., Nov. 23	Thanksgiving recess begins after last class
Mon., Nov. 28	Classes resume at 8:00 a.m.
Tue., Dec. 6	Last day of classes.
Wed., Dec. 7	Study Day
Thu., Dec. 8	Feast of Immaculate Conception—Christmas on Campus
Fri.-Thu., Dec. 9-15	Examinations
Sat., Dec. 17	Diploma Exercises

SECOND TERM

Wed., Jan. 4	Classes begin at 8:00 a.m.
Mon., Jan. 16	Martin Luther King Jr. Day—no classes
Mon., Feb. 20	Presidents' Day—no classes
Fri., Mar. 10	Spring Break begins after last class
Mon., Mar. 20	Classes resume at 8:00 a.m.
Thu., Apr. 13	Easter recess begins after last evening class
Tue., Apr. 18	Classes resume at 8:00 a.m.
Wed., Apr. 26	Last day of classes.
Thu., Apr. 27	Study Day
Fri.-Thu., Apr. 28-May 4	Examinations
Sun., May 7	Commencement

THIRD TERM—FIRST SESSION

Thu., May 11	Classes begin at 8:00 a.m.
Thu., May 25	Ascension Thursday — classes will be held
Mon., May 29	Memorial Day—no classes
Tue., Jun. 20	Last day of classes
Wed.-Thu., Jun. 21-22	Examinations

THIRD TERM—SECOND SESSION

Fri., Jun. 23	Classes begin at 8:00 a.m.
Tue., Jul. 4	Independence Day—no classes
Wed., Aug. 2	Last day of classes
Thu.-Fri., Aug. 3-4	Examinations
Sat., Aug. 5	Diploma Exercises

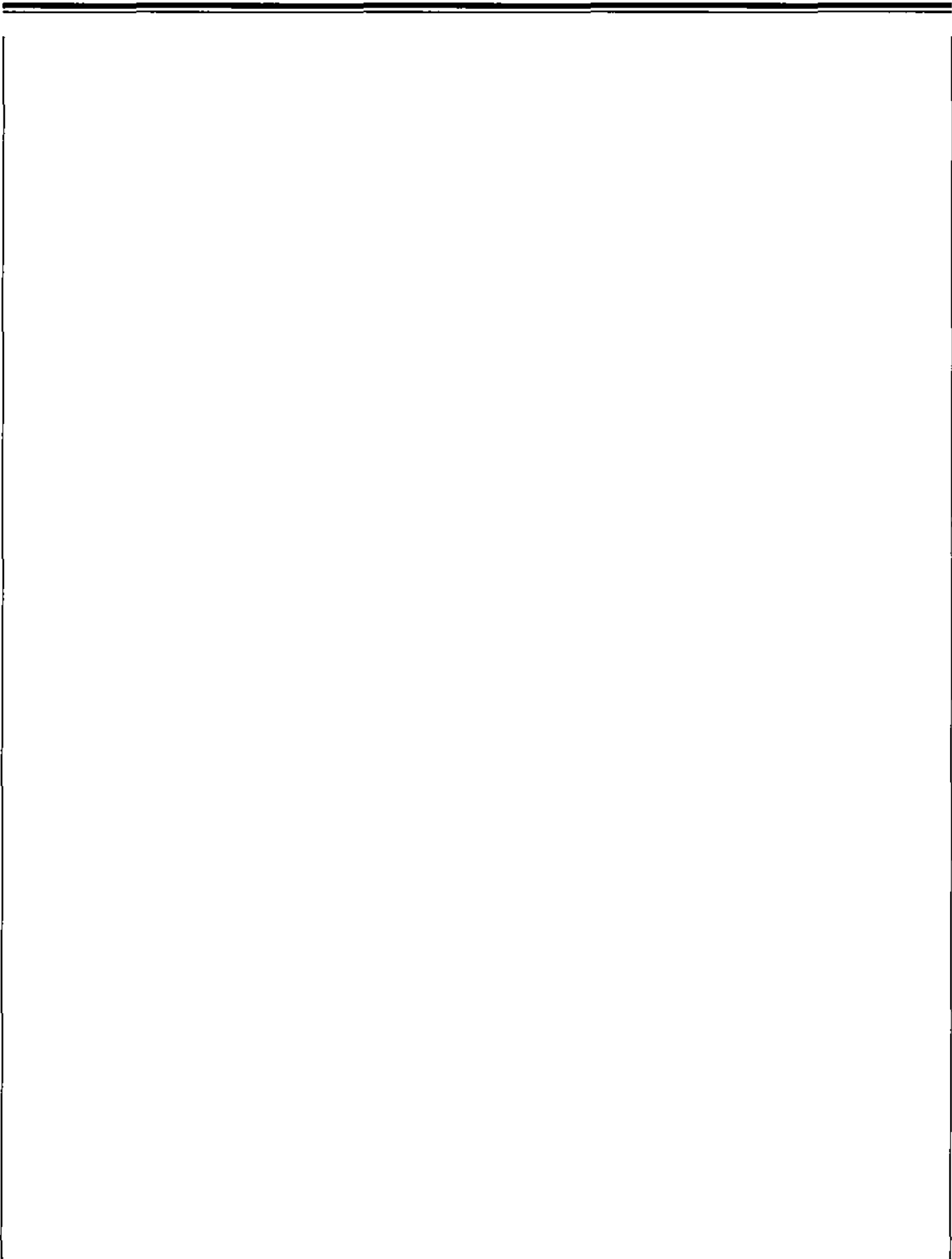


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I THE UNIVERSITY OF DAYTON

Founded in 1850

The University of Dayton is a private, coeducational school founded and directed by the Society of Mary (the Marianists), a Roman Catholic teaching order.¹ It is among the nation's largest Catholic institutions of higher learning. Aware of the cultural richness of diversity, the University numbers among its students and faculty representatives of many faiths. For the same reason, the University has consciously drawn its students and faculty not only from the immediate community and adjoining states but from across the country and from numerous foreign countries.

The main campus is one hundred one landscaped acres on a hill overlooking the city of Dayton, Ohio. The buildings are a pleasantly eclectic architectural mixture of old and new. The faculty is well-qualified and competent to provide students with superb instruction and prudent counseling.

A lively, friendly atmosphere; reasonable tuition rates; financial aid plans; numerous and varied religious, cultural, and social opportunities; an early-semester calendar allowing a number of study-recess options; intercollegiate and intramural athletic programs for both men and women; academic options such as interdisciplinary programs, field study and internships; academic, professional, and personal counseling; cooperative work-study plans; a placement service for students and graduates—these exemplify the many aspects of the character of the University of Dayton.

BRIEF HISTORY

In March 1850, Marianist Father Leo Meyer, recently arrived from France, purchased Dewberry Farm in Dayton from John Stuart, a descendent of the

old royal family of Scotland. The University of Dayton had its earliest beginnings here on July 1, 1850 when St. Mary's School for Boys, a frame building that not long before had housed farm hands, opened its door to fourteen primary students from Dayton.

By 1860, when Brother Maximin Zehler became president, enrollment approached one hundred. St. Mary's grew; an old history refers to the period of 1860-1875 as "the brick-and-mortar years." In 1870, visitors marveled at new St. Mary's Hall, the largest building in the city of Dayton, and called it Zehler's Folly. But when the "college department" moved into it in 1871, it proved not too big at all. Construction went on.

Known at various times as St. Mary's School, St. Mary's Institute, and St. Mary's College, the school established its present identity in 1920, when it was incorporated as the University of Dayton. The same year the University started its tradition of evening and Saturday classes, to serve the adult members of the surrounding community. In 1922, a School of Law opened, also with evening classes. Other graduate programs followed. In 1923, the first summer session took place, its classes open to women as well as men. This decade of academic growth and innovation was also a time of increased emphasis on sports here and across the country. Sports, however, were no novelty here: in 1874, for example, St. Mary's Institute's new gymnasium was the only one of its kind in Ohio, and tradition holds that the first organized basketball game in the state took place there.

The 1930's and the early 1940's, for obvious reasons, were in many ways a time of retrenchment for the University of Dayton as for most other schools. In

1935, even as it closed its preparatory school and graduated its last class from the old law school, the University inaugurated a college for women, with sisters of Notre Dame in charge of 27 entering students. Two years later, the college for women closed, the deans opened all divisions to women, and the University of Dayton became co-educational.

Today, the University of Dayton is a modern comprehensive university consisting of the College of Arts and Sciences, the School of Business Administration, the School of Education, the School of Engineering and the Division of Engineering Technology, the School of Law, and the Research Institute.

Advanced degrees are given in the College and all Schools. The University of Dayton is accredited as a comprehensive university and is listed in the top 100 research universities in the United States.

STATEMENT OF PURPOSE

A graduate school, through its faculty, seeks to create and maintain the academic milieu for excellence in graduate work. Therefore, its influence and encouragement extend first to its own members and their scholarly activities. Because it conceives as the form and substance of graduate work not the credits accumulated but the mastery of a subject and the understanding of its relationship to kindred subjects, the graduate school seeks further to impart to its students thorough knowledge in academic fields, special skills in research, and sharpened powers of independent thought. Yet, while it gives them the resources, the guidance, and the inspiration of a scholarly staff in its classrooms,

¹The Society of Mary, founded in France in 1817 by Father William Joseph Chaminade, presently conducts schools throughout the United States and in Africa, Australia, Canada, Japan, Europe, and South America. The Society operates Chaminade College in Hawaii and St. Mary's University in San Antonio, Texas.

laboratories, and libraries, it expects the students themselves to bring marked initiative and energies to their work and to assume full responsibility for the progress of their studies.

In short, graduate work, for the student at the University of Dayton, has for its purpose an integrated program of advanced study based on adequate undergraduate preparation in a specific field. It presupposes academic and personal maturity and makes more than an average demand upon the initiative, the industry, and the scholarship of the candidate for an advanced degree.

The official statement of purposes of the University of Dayton was approved by the Board of Trustees May 14, 1969:

The University of Dayton, by tradition, by legal charter, and by resolute intent, is a church-related institution of higher learning. As such, it seeks, in an environment of academic freedom, to foster principles and values consonant with Catholicism and with the living traditions of the Society of Mary. Operating in a pluralistic environment, it deliberately chooses the Christian world-view as its distinctive orientation in carrying out what it regards as four essential tasks: teaching, research, serving as a critic of society, and rendering public service.

The University of Dayton has as its primary task to teach—that is, to transmit the heritage of the past, to direct attention to the achievements of the present, and to alert students to the changes and challenges of the future. It regards teaching, however, as more than the mere imparting of knowledge; it attempts to develop in its students the ability to integrate knowledge gained from a variety of disciplines into a meaningful and viable synthesis.

The University of Dayton holds that there are harmony and unity between rationally discovered and divinely revealed truths. Accordingly, it commits its entire academic community to the pursuit of such truths. It provides a milieu favorable to scholarly research in all academic disciplines, while giving priority to studies which deal with problems of a fundamentally human and Christian concern. It upholds the principle of responsible freedom of inquiry, offers appropriate

assistance to its scholars, and endeavors to provide the proper media for the dissemination of their discoveries.

The University of Dayton exercises its role as critic of society by creating an environment in which faculty and students are free to evaluate, in a scholarly manner, the strengths and weaknesses found in the institutions developed by man. While as an organization it remains politically neutral, objective and dispassionate, it encourages its members to judge for themselves how these institutions are performing their proper tasks; to expose deficiencies in their structure and operation; to propose and to actively promote improvements when these are deemed necessary.

The University of Dayton recognizes its responsibility to support, with means appropriate to its purposes, the legitimate goals and aspirations of the civic community and to cooperate with other agencies in striving to attain them. It assists in promoting the intellectual and cultural enrichment of the community; it makes available not only the resources that it possesses, but also the skills and techniques used in the accumulation and dissemination of knowledge. Above all, it strives to inspire persons with a sense of community and to encourage men and women of vision who can and will participate effectively in the quest for a more perfect human society.

ADMINISTRATIVE STRUCTURE

The University of Dayton includes the College of Arts and Sciences and four professional schools: the School of Business Administration, the School of Education, the School of Engineering (including Engineering Technology), and the School of Law. The Deans, through their departments, administer the undergraduate and graduate programs. The Associate Provost has the overall responsibility for all graduate programs, and also administers all research activities connected with the University. The administrative head for academic affairs is the Vice President for Academic Affairs and Provost.

ACADEMIC YEAR

The University of Dayton operates on an early semester, split third-term calendar. The academic year begins with the fifteen-week fall term, which ends before Christmas. The winter term, also fifteen weeks, begins in January and ends early in May. The third, or spring-summer term, is split into two complete sessions of six weeks each.

The advantages of such a calendar are many. Students may enroll for the traditional fall and winter semesters and have a four-month summer vacation; or they may add half terms or full terms to enrich their programs or speed the completion of their graduate requirements. The University holds graduation ceremonies at the end of each term. Students who are employed have extra time in spring and summer, or they may enroll for the third term and work during the fall or winter term.

ACCREDITATION

The University of Dayton is officially accredited by the following agencies:

- The Accreditation Board for Engineering and Technology, Inc., for the programs in chemical, civil, electrical, and mechanical engineering and in electronic, industrial, manufacturing and mechanical engineering technology
- The American Assembly of Collegiate Schools of Business for the baccalaureate and Master of Business Administration programs of the School of Business
- The American Bar Association for its School of Law
- The Association of American Law Schools for its School of Law
- The Computer Science Accreditation Commission of the Computing Sciences Accreditation Board
- The National Association of Schools of Music

- The National Council for Accreditation of Teacher Education
- The North Central Association of Colleges and Schools
- The State of Ohio Department of Education

The University has the approval of the following:

- The American Chemical Society for its program in Chemistry
- The American Dietetic Association for Plan IV (Program S8) in Human Ecology
- The National Association for Music Therapy
- The League of Ohio Law Schools for its School of Law

INSTITUTIONAL MEMBERSHIPS

The University holds institutional memberships in the following:

- The Academy of Criminal Justice Sciences
- The American Assembly of Collegiate Schools of Business
- The American Association for Higher Education
- The American Association of Colleges for Teacher Education
- The American Association of Collegiate Registrars and Admissions Officers
- The American Association of University Administrators
- The American Council on Education
- The American Home Economics Association
- The American Library Association
- The American Society of Criminology
- The American Society for Engineering Education
- The Association of American Colleges
- The Association of American Law Schools
- The Association of Catholic Colleges and Universities
- The Association of Colleges and Universities Housing Officers
- The Association of Governing Boards of Universities and Colleges

- The Association of Independent Colleges and Universities of Ohio
- The Catholic College Coordinating Council
- The College Entrance Examination Board
- The College and University Personnel Association
- The Comparative and International Education Society
- The Cooperative Education Association
- The Council for Advancement and Support of Education
- The Council for the Advancement of Experiential Learning
- The Council of Graduate Schools
- The Dayton Area Chamber of Commerce
- The Dayton Art Institute (sponsoring)
- The Institute of International Education
- The League of Ohio Law Schools
- The Midwestern Criminal Justice Association
- The National Association of College and University Food Services
- The National Association of College Auxiliary Services
- The National Association for Foreign Student Affairs
- The National Association of Independent Colleges and Universities
- The National Association of Student Personnel Administrators
- The National Catholic Education Association
- The National Council of Catholic Bishops
- The National Scholarship Service and Fund for Negro Students
- The National University Teleconference Network
- The North Central Association of Colleges and Schools
- The Ohio Academy of Science
- The Ohio Association of Colleges for Teacher Education
- The Ohio Association of Private Colleges for Teacher Education
- The Ohio College Association
- The Ohio Continuing Higher Education Association
- The PBS Adult Learning Satellite Service

- The Regents Advisory Committee on Graduate Study
- The Society for the Advancement of Education
- The Southwestern Ohio Council for Higher Education

SOUTHWESTERN OHIO COUNCIL FOR HIGHER EDUCATION

Several corporations and numerous institutions of higher learning, including the University of Dayton, have organized the Southwestern Ohio Council for Higher Education (SOCHE). The participating institutions seek to increase inter-institutional cooperation, improve curricula, develop new courses and programs, share library resources, minimize cost, and centralize selected functions, by using computers, modern educational technology, and communication media.

Among the benefits of the Council is that regularly enrolled full-time students at one institution, under certain conditions, may register for credit at no additional charge in courses offered by other Council institutions in which no instruction is available at their own institution. Also available through the Council is the Air Force ROTC program.

RELATED UNIVERSITY SERVICES

Besides the regular day sessions, the University conducts special as well as regular evening and summer sessions and offers short-term workshops, institutes, and conferences. All credited courses, whenever offered or in whatever form, conform to the same standards and are governed by the same policies and regulations prevailing during the regular day sessions.

University Continuing Education especially serves the part-time students of the Dayton community, to make the University and its course offerings, both credit and noncredit, more easily available to them. Similarly, the Office of Institutional Services serves students from other countries who are enrolled at the University.

OFF-CAMPUS ACADEMIC CENTERS

The University of Dayton maintains off-campus centers, all of them in Ohio, for graduate study in Business Administration (Columbus); Education (Lima, Columbus, Rio Grande, and Steubenville); Religious Studies (Columbus) and Political Science (WPAFB). All programs and courses are closely supervised by the Deans of Education, Business, and Arts and Sciences as well as the Dean for Graduate Studies and Research. Most of these courses are taught by the faculty teaching the same course on the main campus.

CAMPUS MINISTRY

Campus Ministry seeks to lead the university in fostering a faith community among its members. This faith is manifested in personal and communal devotion to God, especially as revealed to Jesus Christ; in common worship; in the quality of relationships among the members of the community; and in efforts at enriching humanity and the world through the articulation of moral and religious values and their implementation.

To achieve this goal, Campus Ministry provides a number of services to all who are part of the university community. It cooperates with all

segments of the University in fostering human development and the articulation and implementation of moral and religious values. It provides opportunities for prayer, for the celebration of the sacraments, for retreat experiences, and for pastoral counseling. It sponsors events, classes, and seminars that concern the deepening of faith, the awareness of human needs, and the practice of religious and moral values. It coordinates the efforts of twenty-five student organizations that offer opportunities for community service. Though specifically Roman Catholic, it cooperates with and helps foster other religious groups on campus.

II FINANCIAL INFORMATION

GENERAL POLICY

Tuition fees, room and board may be paid in full before the term starts or, in the Fall and Winter terms, in five monthly payments with a 1% per month finance charge assessed on the ending balance. A one-time signed opened credit agreement is required unless full payment is made initially. A late registration fee will be assessed if registration is finalized on the first day of the term or later.

TUITION AND FEES*

**Subject to change. See recent course composites for latest updates.*

Tuition for undergraduate semester hour credit	\$340.00
Per laboratory course clock hour	(max. \$200) 40.00
Tuition for graduate credit hour (except as noted below)	308.00
Doctoral student per credit hour	332.00
Religious courses (per credit hr)	231.00

School of Education

QUARTER HOUR CREDIT

On campus per quarter hour	108.00
Off campus per quarter hour	113.00
ED.S. Grad Program for Education Specialist per quarter hour (800 level courses)	145.00
Sec. & Elem. teachers and school administrators (graduate sem. hr.) ...	231.00
Applicable only to School of Education programs or classroom related programs in other areas. Undergraduate courses required as part of a graduate program are included.	
Doctoral (Per Quarter Hour)	165.00
Doctoral (Per Semester Hour) ...	249.00

STUDENT TEACHER FEES

Elementary or Secondary Teacher	110.00
Special Education or Special Arrangements Student Teacher	80.00
Concurrent registration for both of the above	190.00

Education Block fees	
Elementary for EDT526	50.00
MISCELLANEOUS	
Application fee	25.00
International student application fee	25.00
University Fee (on campus only)	20.00
Audit per semester hour	154.00
Audit per quarter hour (on campus)	54.00
Audit per quarter hour (off campus)	57.00
Audit—Doctoral quarter hour (Education)	83.00
Audit—Doctoral semester hour (Education)	125.00
Audit per semester hour . . . Religious Studies, secondary, elementary teachers, and administrators..	116.00
Audit per quarter hour. . . Education Specialist Program	73.00
Registration late fee—Beginning the first day of the term. 15.00/per week to a maximum of 45	
Transcript of credits, first copy of order	2.00
\$1.00 per each additional copy of same order	

Special fees are charged where applicable. (see remarks column) Students receiving authorizations paying a portion of their tuition must pay the balance, plus any additional fees.

An assessment of \$25.00 will be made for payment of tuition and fees by a bad check, and cancellation of the student's registration may result until proper payment is made of tuition, fees, and special assessments.

The University reserves the right to make changes in its tuition and fees for any or all graduate courses at any time. Current information should be obtained from current course composites, or by contacting the department in which the course is offered, or the Office for Graduate Applications & Records, or the Registrar's Office.

CANCELLATION AND REFUNDS

Cancellations will be allowed only after the completion of the proper Drop-Add Form. For refund purposes the effective date of cancellation is the date the student submits the official Drop-Add form, not the last day the student attends class. The date that appears on the official Drop-Add form will be forwarded to the Bursar's Office, and that date will determine the amount of refund due, if any.

Students attending academic centers away from the main campus may write a letter to the appropriate Dean requesting withdrawal if a Drop / Add form is not available. Requests for refunds must be in writing and addressed to the Bursar. Students who discontinue class attendance without officially completing the withdrawal procedures will be responsible for the full amount of the applicable tuition and fees.

Tuition refunds for cancellations in the first and second terms will be made according to the following schedule:

During the first week of classes	80%
During the second week of classes	60%
During the third week of classes	40%
During the fourth week of classes	25%
During and after the fifth week of classes	0%

Tuition refunds for cancellations in either session of the split third term will be made according to the following schedule:

During the first week of classes	65%
During the second week of classes	30%
During or after the third week of classes	0%

TRANSCRIPTS

A transcript of the permanent academic record is a confidential document to be released in compliance with the regulations of the Family Educational Rights and Privacy Act of 1974 as amended. The Registrar will issue transcripts upon a request signed by the student provided that no outstanding financial obligation to the University exists. All transcripts so requested require payment in advance. Complimentary copies will be mailed to graduates within approximately six weeks after graduation.

ASSISTANTSHIPS AND FELLOWSHIPS

A limited number of graduate assistantships are available, in the College of Arts and Sciences, and Schools of Business, Education, and Engineering. These carry a stipend plus tuition remission for courses required in that degree. Recipients are expected to complete the master's degree in two years. Graduate Summer Fellowships for research and creative activities during the third term of the academic years are also available to graduate

students who wish to devote that term to a research project.

Detailed information and application forms may be obtained from the chair or director of the desired graduate program.

III LIBRARIES AND RESEARCH SERVICES

ROESCH LIBRARY

The Roesch Library houses the book, journal, government document, and microfilm collections for both graduate and undergraduate students. Its volume holdings number over a million and its journal titles almost 5,000. Through OCLC the library is interactive with the bibliographic holdings of over 4,000 academic and research libraries around the world. The Roesch Library is fully automated through an integrated online catalog, circulation, and acquisitions/serials control system. Dial-in access to the collections is available from off-campus. The Library also houses the Marian Library, the rare books collections, other special collections, and the University Archives.

The Marian Library on the seventh floor of the Roesch Library, is the world's largest collection of printed materials on the Virgin Mary. Its resources, in over fifty languages, include over 71,000 books and pamphlets - some 6,000 printed before 1800 - runs of 125 periodicals, a clipping file of nearly 52,000 items, microfilm, a philatelic collection, and noteworthy accumulations of slides, medals, postcards, photographs, and other pictorial materials. Supplementing these is a general reference library comprising national and regional bibliographies, works on the Bible, church history, religious art (especially Eastern Church art and art of medieval Europe) and the history of the book. The Marian library publishes the scholarly annual *Marian Library Studies*.

SCHOOL OF LAW LIBRARY

The library of the School of Law is located on the ground floor of the

Roesch Library. Its collection exceeds 170,000 volumes.

ACCESS TO OTHER RESOURCES

The Roesch Library is part of Ohio's pioneering OhioLINK project, linking the library resources of seventeen state and private academic and research libraries and the State Library of Ohio. A delivery service between these institutions guarantees delivery of requested materials within three days. The Library is an associate member of the Center for Research Libraries, giving it access to hundreds of additional specialized collections. The Library is an active member of the Library Division of the Southwestern Ohio Council for Higher Education which furthers access to regional libraries. Graduate students also have direct on-site borrowing privileges with all OhioLINK libraries and with nearly all Southeastern Ohio Council for Higher Education libraries.

COMPUTERIZED ONLINE LITERATURE SEARCHING

The Roesch Library has access to several hundred online data bases, providing information in every area of study within the University. Numerous Compact-Disc (CD-ROM) databases are available within the Roesch Library. There is also access to many full-text sources through the Lexis/Nexis system. The OhioLINK system provides a number of central system databases as well. Online searches are free-of-charge to graduate students.

CENTER FOR THE COMPUTER IN EDUCATION

The Center for the Computer in Education (CCE), located in Chaminade Hall, houses 32 microcomputers (Apples, Macintoshes, NCR PCs). The CCE exists primarily as a multi-functional computer resource area: a preview center; a reference library; and a computer training center for the School of Education students, faculty, and staff. The CCE provides a suitable environment in which educators and students may use software, learn the basics of computer literacy, and employ these skills for the betterment of education and the community.

THE SCHOOL OF EDUCATION CURRICULUM MATERIALS CENTER

The Louis J. Faerber, S.M. Curriculum Materials Center houses the specialized collections of the School of Education and is located in Chaminade Hall. Its collection offers elementary and secondary school teaching materials, filmstrips, recordings, transparencies, cassettes, charts, material kits, and other teaching aids and resources for graduate students. The center also houses research projects, theses, and dissertations completed in the School of Education.

RESEARCH INSTITUTE

As an integral part of the University, the Research Institute conducts sponsored research for industrial and governmental agencies. Areas of research are very diverse and include structural analysis, electro-optics,

computer modeling, hypervelocity impact, hazardous materials processing, stereo lithography, superconductivity, metals, ceramics, polymers, composite materials, microanalysis, human factors, and fracture mechanics.

While some research projects are conducted within the University's departments of instruction, the larger interdisciplinary projects are conducted by full-time research appointees in the Research Institute. Involvement of the

teaching faculty and students, at both the graduate and undergraduate level, is encouraged as a means of enhancing the educational process.

IV STUDENT LIFE AND SERVICES

The Vice President for Student Development and the Dean of Students and staff are responsible for assisting in developing and maintaining an environment which will support the educational goals and the values of the University of Dayton. While students are encouraged to make decisions, it is understood that decision-making involves risks. The Student Development staff provides individual and group counseling and supportive reinforcement, treating all students as individuals. All members of the Student Development staff are professional counselors. The responsibilities of the Vice President and Dean of Students include University Residential Services, Student Activities, Student Government Association, Campus Discipline, Special Programs, the Kennedy Union, the Counseling Center, the Learning Assistance Center, Health Center, Student Media, Greek Life, Residential Programs, Services for Diverse Student Populations, Public Safety, and Food Services.

HOUSING

The University of Dayton maintains a number of diverse housing units for graduate students. Approximately 90 first-year law students are guaranteed University housing; upperclass law and graduate students' housing needs may also be accommodated. Graduate and law school students interested in University housing should contact the Housing Office at (513) 229-3317 upon their acceptance.

Students are advised to coordinate their housing arrangements as early as possible. If University housing is not available, the Housing Office can provide information regarding private housing in the Dayton area.

FOOD SERVICES

University Food Services operates three full-service dining facilities:

Kennedy Union Food Court, located on the ground floor of Kennedy Union; Kettering Hall, located on the ground floor of Virginia Kettering Residence Hall; and Marycrest Food Court, located off the main lobby of Marycrest Complex. Kennedy Union and Marycrest offer a la carte dining as well as carryout. In contrast, Kettering Hall is an all-you-can-eat concept; this facility does not offer carryout services. Well-balanced, appetizing meals are offered in our dining facilities with menus that feature daily selections of traditional hot foods, fast foods, soup/salad bar, deli sandwiches and desserts.

For evening and weekend dining, Food Services offers extended services in the Kennedy Union and Marycrest Food Courts and the Stuart Hall Snack Bar. In addition to these dining facilities, Food Services operates a student pub located in Kennedy Union.

Food Services uses a computerized dining room access system. A key feature of the access system is the declining balance program. The declining balance program is comparable to a debit card; money is deposited in a graduate student's account and is deducted accordingly as food items are purchased using the University's One Card. Declining balance accounts can be arranged through the Access System Coordinator, Ext. 2441. Graduate students may also use all dining facilities on cash basis if they wish.

PUBLIC SAFETY AND PARKING

The Office of Public Safety is the recognized, lawful professional police agency on all University property. Its objective is to make the University a comfortable, efficient, and safe place. The University of Dayton Public Safety staff are dedicated to the preservation of freedom of movement and commu-

nication without the fear of property loss or personal injury.

Campus parking facilities are limited. Graduate students and graduate assistants will be issued student parking permits. Commuting students are issued permits to park in Lots S1 & S2.

Students living in UD houses or apartments will be issued one permit per house/apartment on a first-come, first-served basis. Others will be placed on a waiting list upon request. Drivers with unusual problems will be given special consideration. Students may apply for parking permits at Parking Services in Gosiger Hall, 2nd floor.

STUDENT IDENTIFICATION CARDS

All registered students must have validated student identification (ID) cards. This card, validated for the given term, is needed to withdraw books from the Roesch Library and to obtain other University services. Effective Fall, 1993, the University has implemented a new ID called the One Card. The One Card is issued and validated by the Department of Food Services.

KENNEDY UNION

"The Union is a community center of the University. It is the 'living room' or the hearthstone of the college. The Union is part of the educational program. It serves as a unifying force..." Kennedy Union offers interaction between the faculty and students through programming and activities, i.e., U.D. Forum on Global Concerns, Distinguished Speakers, Christmas on Campus, Campus Carnival, concerts, and plays. It offers opportunities to serve on committees together, to advise and socialize.

Facilities include meeting rooms, faculty dining rooms, Art Gallery, Boll Theatre, Ballroom, Games Room, Lounges, Pub, and Food Court.

Services include catering service, information desk, subscriptions to New York Times and Wall Street Journal, two automatic teller machines, display cases and bulletin boards, check cashing (limit of \$10.00), Candy Bar, bakery, vending machines, Wagon-Lits Travel Office, and van rental for field trips.

RECREATIONAL SPORTS

The Recreational Sports Department conducts activities of interest to the men and women of the University of Dayton. The aim is to provide individuals opportunities to participate in some activity of their own choosing, insofar as facilities and equipment permit. Intramural activities are organized on a team and individual basis, thereby enabling all to participate.

The Recreational Sports office, located in Room 27 of the Fieldhouse, is the administration center for men's, women's, and coed Intramural Programs. Any suggestions or questions about the Intramural Program should be directed to the director of recreational sports at 229-2731.

GRADUATE STUDENTS. A graduate student membership costs \$35.00 individual and \$45.00 for a family membership for a full year starting August 15. Facilities available to graduate students include Physical Activities Center and Fieldhouse. They house the following:

PAC

- I. Collins Gymnasium
 - a. Four basketball/tennis courts
 - b. 1/10 mile jogging track
- II. Lackner Natatorium
 - a. Eight lane —25 yd. Indoor heated pool
 - Two—1 meter diving boards
 - One—3 meter diving board
 - b. 2500 sq. ft. Sun Deck
- III. Weight Room
 - a. Six Universal Gym Machines

IV. Multi-Use Room

- a. Two table-tennis tables
- b. One set of exercise mats

V. Racket Courts

- a. Three handball/racquetball
- b. One squash court

Fieldhouse

I. Main Gymnasium

- a. Four basketball/volleyball courts
- b. Three badminton courts
- c. Seating for 3,500

II. Weight Room

- a. Nautilus Equipment
- b. 2000 lbs. Olympic weights

HEALTH SERVICES

Medical care is available at the Health Center to all full-time and part-time graduate students. Basic medical care and most nonprescription medicines are provided without charge. The Health Center is open from 8 a.m. to 7 p.m. on weekdays and from 8 a.m. to 3 p.m. on Saturdays. In case of emergency, call Public Safety, 2121. A physician is available for consultation every weekday morning and afternoon. Every student born after 1955 is required to show evidence of immunity to measles, mumps, and rubella. Immunization record blanks are available at the Health Center.

Pre-admission physical examinations are not required, but students with chronic health problems are advised to have their physicians send records or recommendations to the medical director. Full-time graduate students are eligible for student health and accident insurance. For information about this program visit the Health Center.

AFFIRMATIVE ACTION AND EMPLOYEE DEVELOPMENT OFFICE

The Affirmative Action and Employee Development Office provides services to the University's staff and faculty in three areas: Affirmative Action/Equal Employment Opportunity (AA/EEO) Compliance, staff develop-

ment and minority faculty, and graduate student recruiting.

CENTER FOR INTERNATIONAL PROGRAMS

The Center for International Programs provides leadership, coordination, and administrative support for the development of international understanding and sensitivity among the University's faculty, staff, and students through research, study abroad, exchanges, services to international students and scholars, and other programs. It serves in an advisory capacity and as a resource center to assist academic units in strengthening the international dimensions of their curricula. It is also committed to community outreach through conferences, seminars, speakers, and workshops organized in cooperation with the University's academic units and community agencies.

Center faculty development and research activities include the associates program, seminars, and visiting scholars. Center associates are appointed by the director upon the recommendation of the center's advisory board.

The Center coordinates and provides administrative support for study abroad and other international educational programs, including the Third World Immersion program. The Office of International Educational Programs is a resource center also for information on non-UD sponsored programs.

INTERNATIONAL SERVICES OFFICE

The International Services Office handles immigration and credential evaluation matters and provides academic and nonacademic advising, orientation, cultural and other programming services for international students and scholars on campus. It also organizes cross-cultural workshops with faculty and staff to create a supportive environment for international students and scholars.

THE COUNSELING CENTER

In keeping with the University's dedication to educating the whole person, the Counseling Center is designed to assist students in self-development. Graduate students may find a time when they need an "objective third party" with whom to express their feelings and thoughts about personal situations. Difficulties with decision-making, interpersonal relationships, loneliness, family-marital issues, career choice, and insomnia, are some concerns that postgraduate students may encounter. The Center provides an atmosphere in which these, or any other issues, can be discussed freely and openly. Students decide to what extent they want to divulge personal information. Strict professional confidentiality is maintained at all times. No information regarding conversations leaves the Center without the students' permission except in the case of life-threatening situations.

All undergraduate students pay an initial student fee to cover the cost of these services. Graduate and Law students are not initially charged a fee for these services. If a choice is made to make use of the Center and its facilities, there are two possible fee structures. The first option is to pay \$10 per session.

If the need arises to use the Center throughout the time spent at the University of Dayton, then paying an \$83 fee would cover all visits. No graduate or Law student would ever

pay more than \$83 for these services. All students are encouraged to use the Center and not allow the fear of being charged a fee to be a stumbling block to seeking assistance. Special arrangements can be made, and there is no charge for the first session.

Appointments can be made in person or by phone. Making an appointment is customary. If an emergency arises, however, no appointment is necessary and students will be seen as soon as possible.

PRIVACY RIGHTS OF PARENTS AND STUDENTS

In compliance with Section 438 of the General Education Provisions Act the University of Dayton has published regulations designed to protect the privacy of parents and students as to the access and to the release of records maintained by the institution (see *University of Dayton Student Handbook*).

THE STUDENT HANDBOOK

Each student at the University of Dayton is responsible for knowing and observing the policies, regulations, and procedures contained in the official student handbook. This publication provides much other useful information, such as University services, and intercollegiate sports schedules. Student handbooks are available at the opening of the Fall Term in Kennedy Union and the McGinnis Center.

GRADUATE ASSISTANT—OFFICE OF RESIDENCE LIFE

The Residence Life Office offers Graduate Assistantships for positions as Director of the Residence Hall facilities. Remuneration includes stipend, room and board, tuition remission, and health insurance. Acceptance into a strong graduate program at the University is required. Applications and resumes should be sent to the Office of Residence Life, 227 Gosiger Hall, University of Dayton, Dayton, Ohio 45469-0962.

STUDENT ACTIVITIES OFFICE

The Student Activities Office is responsible for providing support and direction to officially recognized student groups and organizations. The office grants official recognition status; monitors compliance with recognition standards; allocates and monitors the use of university funds/space in support of student organizations; provides leadership training; and provides direction and support to faculty advisors.

The Student Activities Office also includes student media advising (i.e. the DAYTONIAN, WDCR, ORPHEUS, and FLYER NEWS), the OFFICE OF GREEK LIFE and the COORDINATOR OF GREEK LIFE.

V GENERAL ACADEMIC INFORMATION

The academic requirements and regulations described in this chapter are those of the University which, unless otherwise noted, take precedence over all others and apply to all graduate students. The student is expected to assume full responsibility for knowing and following all pertinent regulations and procedures of the graduate school as set forth in this *Bulletin* and for meeting the standards and requirements expressed herein.

The admission of candidates, their continuance and status, the awarding of academic credits, and the granting of degrees are all subject to the ordinary regulatory powers of the University. The University reserves the right to withhold or cancel, at its discretion, any of these privileges for reasons considered sufficient by its own governing body.

The University of Dayton presently awards the following degrees beyond the Baccalaureate:

Master of Arts
Master of Business Administration
Master of Computer Science
Master of Public Administration
Master of Science
Master of Science in Aerospace Engineering
Master of Science in Chemical Engineering
Master of Science in Civil Engineering
Master of Science in Education
Master of Science in Electrical Engineering
Master of Science in Electro-Optics
Master of Science in Engineering
Master of Science in Engineering Management
Master of Science in Engineering Mechanics
Master of Science in Management Science
Master of Science in Materials Engineering

Master of Science in Mechanical Engineering
Master of Science in Teaching
Educational Specialist Degree in Educational Leadership
Juris Doctor
Doctor of Engineering
Doctor of Philosophy in Biology
Doctor of Philosophy in Educational Leadership
Doctor of Philosophy in Electro-Optics
Doctor of Philosophy in Engineering
Doctor of Sacred Theology

ADMISSION

Men and women graduates of approved colleges or universities who hold the Bachelor's degree are eligible for admission. Applicants must have had adequate undergraduate preparation in their proposed fields of study and must show promise for pursuing higher studies satisfactorily.

Inquiries concerning admission and requests for application forms should be addressed to the Office for Graduate Applications & Records or to the office of the dean of the appropriate School or College. The application for admission to graduate work should be submitted by August 1 for the first term, by December 1 for the second term, by April 1 for the third term, and by June 1 for the second half of the split third term. It is the responsibility of the student that the application, with all necessary supporting documents, be complete and in order. Registration as a graduate student will not be permitted otherwise.

Upon admission, students are designated as full time or part time by their deans or program directors. The determination of such status for graduate assistants, students engaged in research, and, in general, all graduate students is made by their respective chairs.

Graduate students are also classified according to their relationship to formal programs, as follows:

1. **Regular status**—the student who has met satisfactorily all the general requirements of the College or School and the specific requirements of the department in which the program is given.

2. **Conditional status**—the student who must fulfill some prerequisite imposed by the School or department before admission to regular status, and the student whose preparation cannot yet be determined.

3. **Non-degree status**—the student belonging to either of these categories:
—the student will not be officially enrolled in a graduate program leading toward a degree;
—the student fulfills all the requirements and is taking courses for credit but is not seeking a degree.

4. **Transient**—a properly qualified student working toward a degree in another institution who has written authorization from the dean of that institution to take specific courses at the University of Dayton for transfer of credit. The transient student must satisfy all registration requirements of the given course that are mandatory for students working for a degree at the University of Dayton.

APPLICATION

The APPLICATION FORM must be typed or printed in black ink. When completed, it should be returned to the Office for Graduate Applications & Records.

OFFICIAL TRANSCRIPTS must be submitted directly from the Registrars of all previously attended colleges or

universities to the Office for Graduate Applications & Records. Registration will be permitted only when the final transcript (showing the university seal and highest degree attained) is on file.

LETTERS OF REFERENCE should be completed by professional persons able to judge the applicant's academic qualifications for the proposed field of study and returned to the Office for Graduate Applications & Records.

THE UNIVERSITY OF DAYTON operates under an early semester, split third-term calendar. The First Term begins in late August; the Second Term in early January; the Third Term, first session, in May; and the Third Term, second session, in June. (Consult the front of this bulletin for exact dates.)

IT IS THE APPLICANT'S RESPONSIBILITY to see that all required documents are on file at least one month prior to the beginning of the term for which admission is sought.

ADMISSION TESTS

GMATrequired by the SCHOOL OF BUSINESS

GRE required by the following departments: BIOLOGY, COMMUNICATION, PSYCHOLOGY

MAT . . . suggested for the CLINICAL PSYCHOLOGY program

ALL APPLICANTS FOR GRADUATE ASSISTANTSHIPS should include a statement, not to exceed a thousand words, describing academic preparation, vocational objectives, and particular interests in their field of study. Applications are due by March 1 and should be submitted directly to the department.

An application fee of \$25.00 must accompany this form before an application can be processed. Make checks payable to the University of Dayton. This fee is not refundable.

INTERNATIONAL STUDENT ADMISSION

Students from foreign countries should request information and applications from the International Service Office. A student from a foreign country seeking admission to any graduate program must have completed a minimum of sixteen years of schooling, must have earned a Bachelor's degree or its equivalent, and must present evidence of outstanding success in the chosen field of study. An applicant who is a citizen of a foreign country will be required to supply the following along with the formal application form:

1. Non-refundable \$25 application fee.
2. A complete academic record, including secondary school.
3. Three recommendation letters.
4. Scores from the Test of English as a Foreign Language (TOEFL).
5. The Graduate Management Admissions is required of M.B.A. candidates applying to the School of Business.
6. The Graduate Record Examination may be required by some departments and optional with others.
7. A personal vita, including work experience, research study or experience, and professional development objectives.
8. Evidence of financial support to cover all tuition and living costs in the United States. A Bank/financial statement indicating sufficient funds for the first year and a letter from a sponsor indicating support for subsequent year(s) are needed. A Master's degree requires between 2-3 years.

International students should complete the application procedure two months prior to the beginning of classes for any term (see academic calendars). Initial inquiries should be made at least one year before the term in which the student seeks admission.

NOTE: *There are no exceptions for international students to the above rules. For specific directions, see the*

Guide to Admissions for International Students.

VETERANS

The University of Dayton has been approved by the State Approving Agency for Veterans Training to distribute Veterans Benefits. Students must complete and submit a Veterans Schedule Form each semester to receive their educational benefits. Any changes must be reported to the Veterans Affairs Office. Failure to report changes may result in cancellation of Veterans Benefits. The Veterans Affairs Office is located in St. Mary's Hall, Room 202.

UNDERGRADUATE STUDENTS IN GRADUATE COURSES

An undergraduate student may register for graduate courses only under the following conditions:

1. Graduate courses to count toward the undergraduate degree:
 - a. Approval must be obtained from the director of the appropriate graduate program.
 - b. The student's total course load must not exceed 17 semester hours during that term.
2. Graduate courses to count toward the graduate degree:
 - a. Approval must be obtained from the director of the appropriate graduate program.
 - b. The student's total course load must not exceed 17 semester hours during that term.
 - c. The student must be within 15 semester hours of completing the semester-hour requirements for graduation in the undergraduate program.
 - d. Credit obtained for the graduate courses may not be counted toward both the Bachelor's degree and any future Master's degree.
 - e. The undergraduate student whose status is less than full time or 3/4 time must pay the graduate tuition rates to register in graduate courses for graduate credit.

ADVISING

Initial academic advising is usually done by the program director or a temporary advisor. Following this the graduate student may be assigned to a permanent advisor or a graduate committee. In either case all details of the program will be decided by the student and advisor.

REGISTRATION FOR COURSES

The responsibility for being properly registered rests with the student. Registration is required each term or session of all students who enter course work for credit and of all students who wish to audit courses. The written approval of the proper dean or the designated director or advisor is required for admission to any course. Any student who has interrupted the normal sequence of a graduate program is required to apply to the designated advisor or program chair for permission to resume study, at least four weeks prior to the first day of the term.

All students should consult the Graduate Composite for each term well in advance of registration to determine the scheduling of courses. Students enrolling at the off-campus centers should note that although the scheduling of off-campus classes follows the general pattern of the University calendar, they do not necessarily conform to the on-campus academic dates in all details.

MASTER'S AND DOCTOR'S DEGREE REQUIREMENTS

The College of Arts and Sciences and the Schools of Business Administration, Education, Engineering, and Law offer programs variously distributed in time, leading to the Master's and Doctor's degrees. Specific requirements and sequences leading to these degrees are described in Chapters VI through X, as are the specific curricula, courses, and requirements of the Schools and departments offering them.

Residence Requirement

For the Master's degree, at least 24 semester hours of credit, or its equivalent, must be earned at the University of Dayton or its off-campus centers.

For the Doctor's degree, two-thirds of the semester hours required beyond the Master's degree should be earned at the University of Dayton. Generally, this is 48 semester hours beyond the Master's degree. For the Doctor's degree, a student must be a full-time student for at least two semesters or the equivalency.

Transfer Credits

A maximum of two courses of graduate work may be allowed in transfer from other accredited institutions to the University of Dayton provided the work is of B grade or better. The quality points are not transferred. Usually no transfer credit will be allowed for courses taken more than five years previous to matriculation in the graduate schools of the University of Dayton.

During the initial years of operation of any new program, exceptions to this limitation may be made with the approval of the Dean for Graduate Studies.

Advanced Undergraduate Courses

Some programs permit certain 400-level undergraduate courses to be applied to graduate program credit requirements. When such courses are permitted for graduate-level credit, the work done shall be of the grade of B or higher for that credit to be accepted toward a degree. The student must pay the graduate tuition rates when registering in these courses for graduate credit.

Elective Courses

Most graduate programs allow, and encourage, the student to select one or two courses from other related disciplines. Consult the advisor or program director for details.

Foreign Language Requirement

At the discretion of the department offering a particular program, a reading knowledge of a foreign language may be required for the master's degree. Graduate students can take language courses on a class or tutorial basis by special arrangement through the Department of Languages, College of Arts and Sciences. No graduate credit is allowed for the fulfillment of language requirements.

Comprehensive Examination

A comprehensive examination is required in most programs. This examination may be oral or written, or both. Application for any comprehensive examination must be approved by the chair of the student's major department at least two weeks prior to the examination. For further details, consult the explanation under the appropriate individual program in this Bulletin.

Thesis and Other Requirements

Students in a program requiring a thesis, an equivalent project, a candidacy examination, or a dissertation may begin work only with the approval of the program director or of an advisor delegated with the authority to give it. Both the form and the content of the final work must have the approval of at least three members of the department, including the faculty advisor and the chair or director.

The Manual for the Preparation of Graduate Theses and Dissertations is available from the Office for Graduate Applications & Records, 117 St. Mary's Hall or the Office for Graduate Studies and Research, 200 St. Mary's Hall.

Final copies of a master's thesis in approved form must be submitted at least two weeks before the date of graduation. Students in doctoral programs should consult appropriate sections of this *Bulletin* for requirements concerning candidacy and such matters as the number of copies of the dissertation, as well as for regulations governing topics, approval, and procedures.

Sufficient Progress

Students are expected to maintain sufficient progress towards a degree. At various intervals, usually at each registration period, and especially at mid-point in the program, the advisor or program director will discuss rate of progress with the student. Students not showing promise of completing the program in a reasonable time may be advised to withdraw from the University.

Appeal For Change of Grade

Any appeal for change of grade for a particular course should be directed to the dean of the School in which that course is offered.

Time Limit

All requirements for a master's degree must be satisfied within seven calendar years from the time of matriculation.

All requirements for a doctoral degree must be satisfied within five calendar years after admission to candidacy.

Second Master's Degree

In some cases a student, either possessing a master's degree or currently studying toward one, wishes to obtain an additional master's degree in a related field. Only six semester hours from the first program may be applied toward the requirements of the additional degree.

ACADEMIC STANDARDS

To be in good standing, a graduate student must have a 3.0 quality point average at all times. Grades are expressed on the student's permanent record in the following manner:

- A—**Excellent:** 4 quality points are assigned for each semester or quarter hour.
- B—**Average:** 3 quality points are assigned for each semester or quarter hour.

C—**Poor:** 2 quality points are assigned for each semester or quarter hour.

F—**Failed:** 0 quality points are assigned.

CR—**Passed:** Credit is given, but no corresponding quality points are given. This is used by certain departments when the thesis or special courses are not to affect the 3.0 cumulative quality point average needed to be in good standing.

I—**Incomplete:** To be used when a course has terminated but the student, for an acceptable reason, has not completed the work of the course.

The I has 0 quality points per hour and does not affect the cumulative point average. It can be changed to a letter grade if the student has completed the work. Otherwise it will remain on the permanent record indefinitely.

K—**Credit:** This mark is used only for credits accepted as transfer credit from other institutions. No quality points are allowed.

P—**In Progress:** For the thesis or for courses which have not terminated at the end of semester. After the course or thesis is completed, the P is replaced on the permanent record by an A, B, C, F, or with the corresponding credit and quality point average.

W—**Withdrawal:** Any withdrawal or change of course must be processed by an official Drop-Add Form through the Registration center, with the approval of the graduate student's advisor. During the first three weeks of a full term (or 10 calendar days of a split term) a graduate student may withdraw from a class without record. Financial adjustments, if allowed, will be made only from the date of notification of withdrawal.

X—**Audit:** This mark indicates that the graduate student has registered to audit the course. No credit hours or quality points are awarded for this mark. NOTE: *Any course taken for audit may not be retaken for credit.*

Em—**Examination:** This mark indicates credit given to students (registered in the University) on the basis of examinations after admission to the University. The level of achievement to be demonstrated by the student on these examinations is determined by the department in which the course is taught. Such credit shall be assigned only on authorization of the dean of the School or College in which the student is registered. No quality points are allowed.

The various deans will review at intervals the work of their graduate students, and in consultation with the program directors and/or chairs of the departments, will recommend that those who are not doing work of high caliber be advised to discontinue courses leading to a degree.

The disciplinary authority of the University is vested in the president by right, and in the deans and other officers on whom jurisdiction may be conferred for specific cases and in restricted areas.

VI INTERDISCIPLINARY AND JOINT STUDIES

Gordon A. Sargent, Vice President for Graduate Studies and Research, and Dean of Graduate Studies

Kitayun E. Marre, Associate Dean of Graduate Studies and Research

INDIVIDUAL INTERDISCIPLINARY PROGRAM

The University of Dayton, under the direction of the Associate Provost, offers individual interdisciplinary programs designed by the student in cooperation with an advisor and representatives from the selected programs. Applicants must have a Bachelor's degree with a general cumulative point average of 2.8 or above, and are expected to submit a formal written request for an individually designed interdisciplinary program to the graduate council.

The interdisciplinary program does not take the place of an established graduate program. Rather, it is a specific program drawn from several disciplines to meet a special need, frequently for job-related requirements. It must produce interrelated applications of specific disciplines and skills at the graduate level. For instance, a clinical dietitian employed in a hospital may seek graduate level expertise in counseling and education for patients with chemical dependencies and for teaching interns. Such a student finds that a Master of Science in the interdisciplinary program serves the special needs for a broader knowledge base encompassing physiology, communication, and counseling. Under the direction of an advisor and a committee of professors from the required areas, a proposed course of study can be defined for this student, submitted to the graduate council, and

after approval, carried out under the advisor's supervision.

Or, to take an instance in the humanities, a student may seek graduate level expertise in historical preservation. Such a student seeks more general learning and professional expertise, and finds that a Master of Arts in the interdisciplinary program serves special needs in history, art, and public administration. Again, under the direction of an advisor and a committee of professors from the required areas, a special course of study can be defined for the student, submitted to the graduate council, and after approval, carried out under the advisor's supervision.

The degree will be either a Master of Arts or a Master of Science. The Program should involve several disciplines and be directed by one faculty member from each discipline. The three faculty members constitute the advisory committee. The final program will be drawn up and approved by the advisory committee. Copies will be sent to the chair of the departments involved.

Of a minimum of 30 semester credit hours required, 15 may be divided between directed study and a thesis, but must be related to the interdisciplinary areas; and 6 semester credit hours of electives in more distantly related areas may also be chosen.

The formal request for an individual interdisciplinary program must include:

1. A general description of the proposed course of study and the reasons for choosing such an interdisciplinary program, rather than one offered in a single department.
2. The courses (at least 15 semester hours) which will be taken and the department involved in the overall work.

3. If a project or thesis is desired, a clear statement of the specific nature of the topic, the research intended, and the purpose of the project or thesis.

OTHER INTERDISCIPLINARY PROGRAMS

THE JURIS DOCTOR/ MASTER OF BUSINESS ADMINISTRATION PROGRAM

Program Directors, Richard P. Perna, J.D., Associate Dean for Academic Affairs, University of Dayton Law School;
Dr. Rebecca Yates, Associate Dean, Business Administration

The JD/MBA joint degree program is an integrated program of studies which leads to both the Juris Doctor and the Master of Business Administration degrees. The joint degree program is a response to a growing need for professionals trained in both fields. The increasing complexity of the law in the Corporate, Tax, and other business related fields has placed new demands upon the attorney, whether in private practice, on the corporate law staff of a firm, or in government work involving business and economic regulation. The combined degree program also provides a potent program of professional study for those who either contemplate or wish to be prepared for law-related and executive positions. The joint program provides both a complete program of legal education and graduate level training in business management. See Chapter VIII for details of the program.

**COMMUNICATION (CAI)
INTERDISCIPLINARY
PROGRAM**

Teresa Thompson, Program Director

The Communication interdisciplinary study program leads to the Master of Arts. It requires 24 semester hours of study in Communication, 12 semester hours of study in one of several designated interdisciplinary areas, followed by oral comprehensive examinations on both the course work and the thesis. See Chapter VII.

ELECTRO-OPTICS (EOP)

Mohammad A. Karim,
Program Director

The programs of study for the Master of Science and Doctor of Philosophy in Electro-Optics are administered by the School of Engineering with the cooperative support of the College of Arts and Sciences. This interdisciplinary activity is coordinated by the Center for Electro-Optics with active participation of the Electrical Engineering and Physics departments and the University of Dayton Research Institute. State-of-the-art graduate electro-optics courses have been designed to prepare electrical engineers and physicists for careers in the evolving electro-optics field. Facilities at the University include 14 laboratories devoted to electro-optics research. See Chapter X.

**INTERNATIONAL MARIAN
RESEARCH INSTITUTE (IMRI)**

Johann G. Roten, S. M.,
Program Director

To facilitate and encourage Marian Studies in the United States and abroad, the International Marian Research Institute (IMRI) was founded in 1975 at the University of Dayton in affiliation with the Pontifical Theological Faculty Marianum in Rome, which is directed by the Servants of Mary.

Since its approval by the Sacred Congregation for Catholic Education on November 5, 1975, IMRI has organized annual graduate-level summer schools to promote the programs of Marian Studies established by the Marianum. IMRI enables students to prepare for the licentiate of sacred theology (S.T.L.) and the doctorate of sacred theology (S.T.D.) with specialization in Marian Studies, to earn a certificate in Marian Studies, or to work toward a master's degree in Theological Studies with specialization in Marian Studies from the Department of Religious Studies at the University of Dayton, offered in a joint program. The course schedule for the S.T.L. degree is designed to be completed within three annual summer sessions. IMRI also offers a non-degree guided studies program.

The IMRI faculty includes scholars who are experts in philosophy, scripture, mariology, spirituality,

ecclesiology, patristics or christology. A primary resource for students studying at IMRI is The Marian Library, the world's largest and most comprehensive collection of materials devoted to studies on Marian doctrine and devotion.

**TEACHER EDUCATION
(EDT)
INTERDISCIPLINARY
PROGRAM**

Roberta Weaver, Chair
James R. Biddle, Assistant Chair

The Department of Teacher Education in the School of Education offers an opportunity for students to develop an individually designed program in a specific area in Education. Students have developed concentrations in such areas as gifted education, adult education, and values education. With the assistance of the faculty, students develop a plan through a selection of offerings in Teacher Education and other departments. See Chapter IX and consult with the assistant chair or the chair of the department.

VII COLLEGE OF ARTS AND SCIENCES

Paul J. Morman, Dean
R. Gerald Keil, Associate Dean for
Graduate and Administrative Affairs

The objectives of graduate work in the College of Arts and Sciences coincide with the general aims and philosophy of education that characterize the University of Dayton.

Programs leading to the Master of Arts or the Master of Science are offered in Biology, Communication, English, Mathematics, Pastoral Ministries, Political Science, Psychology, and Theological Studies. The Department of Computer Science offers the Master of Computer Science. The Master of Public Administration is also offered through the Department of Political Science.

The Physics Department, as part of the Center for Electro-Optics, offers graduate courses in support of the Master of Science and the Doctorate of Philosophy in Electro-Optics. The Doctor of Philosophy degree is also offered by the Department of Biology.

Department of **BIOLOGY (BIO)**

John J. Rowe, Chair of the Department
Robert J. Kearns, Graduate Program
Director

The Department of Biology offers programs leading to the Master of Science and the Doctor of Philosophy. The degrees are in biology, but each program is tailored to the student's own interests and career plans. Specialization is accomplished by selection of courses, by choice of thesis or dissertation topic, and by participation in weekly seminars in the area of interest. The specific program is determined after consultation between the student and the advisory committee. The

Department of Biology also offers a Master of Science program without a thesis requirement. Two major areas of specialization are available. These areas and typical spectra of graduate courses available are as follows:

Environmental/Ecological Sciences

Field Biology
Microbial Ecology
Advanced Plant Physiology
Biochemistry
Molecular Biology
Community Ecology
Behavioral Ecology
Biometrics
Biochemical Genetics
Bioinstrumentation

Basic Biomedical Sciences

Biochemical Genetics
Immunology
Biochemistry
Biometrics
Advanced Microbiology
Advanced Cell Biology
Molecular Biology
Bioinstrumentation

ASSISTANTSHIPS

Qualified applicants are eligible for financial assistance in the form of fellowships, traineeships, research or teaching assistantships. Students admitted to the doctoral program are given priority for these awards. In addition to a stipend, all appointments with financial aid are exempt from tuition during both the academic year and the summer session. Financial aid is usually available during the summer on a competitive basis.

ADMISSION REQUIREMENTS

The successful applicant with a bachelor's degree from an accredited

university should have a cumulative grade point average of 3.0 or better (based on a 4.0 scale). Those with lower averages may be accepted to the program on probationary status, in which case particular attention will be given to the last 60 semester hours of the undergraduate program.

Prior to admittance, applicants must have the equivalent of the science and mathematics requirements of the University of Dayton's Bachelor of Science in Biology. These include one year of calculus, physics, and organic chemistry, plus sufficient background in biology to demonstrate a knowledge of cellular and molecular biology, organismal biology, ecology, evolution, and population biology. Normally, a student who lacks more than one prerequisite will not be admitted to full graduate status. However, the summer session prior to entry can be used to remove a deficiency.

Application forms, a letter indicating career goals, an official college transcript, three letters of recommendation, and current scores on the General Test and the Subject Test in Biology of the Graduate Record Examinations should be on file in the Office for Graduate Studies no later than one month prior to the new term (by 1 August, 1 December, or 1 April). A final transcript or other proof of graduation is required before a graduate student is permitted to register for courses. Foreign students must submit TOEFL scores. Applicants seeking financial aid should apply before 15 April.

ADVISING

Each student is assigned a provisional advisor for assistance during the first semester. Prior to registration for the second semester each student selects a major professor, who serves as director of the student's advisory

committee. The composition of this committee is representative of the general field of study in which the student expects to work.

The committee helps to plan the student's entire program. Prior to the second semester of the M.S. program, the student declares a choice of thesis or non-thesis option. The non-thesis option is not available for Ph.D. students. The committee generally meets with the student twice a year to offer suggestions and to assess progress in the program and thesis research.

PROGRAM REQUIREMENTS FOR THE MASTER OF SCIENCE

The M.S. degree requires 24 semester hours of course work plus a research thesis. During the first year, each student must complete Biological Instrumentation (BIO 552-553), one advanced graduate course, ST seminar (BIO 601), and departmental seminar (BIO 501). Individuals on teaching assistantships must complete the teaching seminar (BIO 503) and teach at least one laboratory course during their course of study.

Students declaring the non-thesis option are required to complete 30 hours of course work consisting of the aforementioned courses. A research paper is required, and the subject matter of the paper is determined by the advisory committee.

DOCTOR OF PHILOSOPHY

Each student is required to complete BIO 552-553, BIO 501, BIO 601 and two advanced courses by the end of the first year. Following completion of the first year, each doctoral student follows the program outlined by the advisory committee. In practice most students find it helpful to take 45 to 60 semester hours of graduate course credits beyond the bachelor's degree to attain the level of competence suitable for a doctoral candidate. When it is desirable, a student will be encouraged to take some work at neighboring institutions or summer laboratories.

Ph.D. CANDIDACY EXAMINATION

The examination for Ph.D. students is administered by the advisory committee, which may be supplemented by members requested by the committee and/or the department chair. The examination will be taken no later than the end of the 4th semester for students entering with a M.S. and 6th semester for those entering the program with a B.S. The purpose of the examination is to judge the student's competence in the special area and in related fields. Following the examinations the student may be directed to (a) complete the dissertation, (b) strengthen preparation by demonstrating competence in one or more areas, (c) withdraw from the program. At the committee's discretion, additional competence in an area may be demonstrated by special examination or by completion of specific courses to the committee's satisfaction. The student is considered a candidate for the Ph.D. after successful completion of these requirements.

DEFENSE OF THESIS OR DISSERTATION

- 1) The examination on the thesis, whether for the M.S. or the Ph.D., will constitute a formal oral examination on the subject matter of the thesis or dissertation.
- 2) For students electing the non-thesis option, an oral examination is held over the subject matter of the research paper.
- 3) A Ph.D. student must present the dissertation for defense within four years after admission to candidacy or repeat the candidacy examination.
- 4) All those working toward the master's degree must complete the program within five years after admission to the program.

RESIDENCE REQUIREMENT

A student is strongly advised to devote as much time as possible to graduate studies. To satisfy the residency requirement, M.S. students must attend the University as a full-time student for at least one full year,

while two full years of study are required of the Ph.D. candidate. If the advisory committee encourages attendance of a semester or a summer as a full-time student at a neighboring institution, that time may be applied to the residence requirement.

SEQUENCE OF EVALUATION

The program is centered around development of professional competence. Each student is formally assessed in the following steps:

- 1) A qualifying examination at the beginning of the second year of full-time graduate study for all graduate students entering with a B.S.
- 2) A candidacy examination over the area of specialization (Ph.D. students only); and
- 3) A defense of thesis.

The overall performance of each student is evaluated, at least yearly, in terms of overall progress toward obtaining the degree by the graduate coordinating committee. A student judged to be making unsatisfactory progress may be placed on probation or dismissed from the program. Further details concerning the policies of the graduate program can be found in *A Manual for Graduate Study in the Department of Biology at the University of Dayton*.

QUALIFYING EXAMINATION

At the beginning of the second full year of graduate work, all (M.S. and Ph.D.) students will take a qualifying examination. An important purpose of the examination is to aid the student's committee in planning the remainder of the program. The examination will cover basic biological concepts, subject matter of graduate courses taken, and broad areas of the student's specialty. The emphasis will be not only on facts but on the student's command of self-expression, ability to reason, and to integrate knowledge.

Utilizing the student's performance in both the written and oral phase, the advisory committee makes an evaluation and suggests one of the following possible alternatives. The student should:

- i. continue to work toward completion of M.S. or Ph.D. degree.
- ii. correct obvious deficiencies and retake the written and/or oral examination(s) — (retake must be scheduled no later than the middle of the next semester and result in a clear pass or fail/withdrawal from graduate work);
- iii. withdraw from graduate work (student has failed the examination without an opportunity of a second chance).
- iv. M.S. students showing outstanding ability and wishing to proceed toward the Ph.D. may be encouraged to stay at U.D. However, they will be required to defend their M.S. thesis in manuscript form (for publication) midway through their 4th semester to qualify for acceptance in the Ph.D. program. Recommendation should be made to the Admissions Committee for final approval and the Departmental Chair should be informed.
- v. It should be noted that at this time, both the student and advisory committee have the final opportunity to review the choice of the M.S. program — thesis or non-thesis option. For the non-thesis option the nature of the requirement should be specified at this time by the advisory committee. If under unusual circumstances, a student wishes to change options beyond this date and the advisory committee concurs, it should be recognized that this may result in an additional semester or more of work. However, consideration should be given to the availability of support for continuation of a M.S. program beyond two years.

Students who choose to complete a Master's degree are considered

candidates for that degree after the qualifying examination. A student who wishes to continue beyond the Master's degree will be advised to continue for the doctorate (see requirements above) or to terminate his/her studies at the university on the basis of his/her performance in earning the Master's degree.

All other graduate examinations are oral examinations which come at specific times in the progress of the student's program and are scheduled and administered by the advisor and advisory committee. These examinations consist of the Ph.D. candidacy examination, the Defense of M.S. Thesis or Ph.D. Dissertation, and the final M.S. Non-thesis Program Exam.

COURSES OF INSTRUCTION

Certain undergraduate courses in biology and in other science or engineering departments may be taken for graduate credit if recommended by the major advisor and approved by the biology chair and the Graduate Dean.

BIO 501. SEMINAR: Presentation of biological research data by staff members and visiting scientists. Required of all graduate students each semester. *0 sem. hr.*

BIO 503. COLLEGE TEACHING SEMINAR: To assist graduate teaching assistants in acquiring information, understandings, and skills seen as important components of effective teaching. *1 sem. hr.*

BIO 505. MICROBIAL ECOLOGY: A study of the diversity of microorganisms and the interrelationships between microorganisms and their environments. Emphasis is placed on aquatic ecosystems. *3 sem. hrs.*

BIO 505L. MICROBIAL ECOLOGY LABORATORY: Examination of the methods of isolation and enumeration of microorganisms and techniques for determining their activities in the field and laboratory. *1 sem. hr.*

BIO 511. COMMUNITY ECOLOGY: An advanced course examining the distribution of species in nature and the ways in which species distribution can be influenced by interactions between species and by the physical forces of their environment. Prerequisite: Introductory course in ecology or permission of instructor. *3 sem. hr.*

BIO 521. BIOCHEMICAL GENETICS: An analysis of the nature of the gene and gene action. Particular attention will be given to genetic control of protein synthesis and to recent advances in biochemical and physiological genetics. Two hours lecture. *2 sem. hrs.*

BIO 521L. BIOCHEMICAL GENETICS LABORATORY: A laboratory to accompany BIO 521 employing an experimental approach to genetic problems. Students work the entire term on a project. *1 sem. hr.*

BIO 522. IMMUNOLOGY: Study of innate and acquired immunity, cells and organs of the immune system, antigens and immunoglobulins. Specific emphasis on the organization and expression of immunoglobulin genes; genetic restriction; cytokines and immune regulation including hypersensitivity, immune tolerance, transplantation and autoimmunity. Biochemistry recommended. *3 sem. hr.*

BIO 523. ADVANCED MICROBIOLOGY: Lectures, readings and discussions of current concepts in basic and applied microbiology, with emphasis on microbial metabolism and physiology. *3 sem. hrs.*

BIO 524. ADVANCED CELL BIOLOGY: This course will explore the structure and function of cells through their biochemical, molecular, and physiological activities. *3 sem. hrs.*

BIO 530. BEHAVIORAL ECOLOGY: An advanced course examining adaptations individual and social behavior. Cost/benefit analyses of adaptive behavior, using examples from the current literature. Prerequisite: Courses in ecology, genetics and animal behavior. *3 sem. hr.*

BIO 535. PROBLEMS IN FIELD BIOLOGY: A course designed to acquaint students with field-oriented problems in Biology. *1-3 sem. hrs.*

BIO 538. POPULATION BIOLOGY: An advanced course considering the relationship of genetics and ecology. Emphasis on the growth and regulation of natural populations. Prerequisites: ecology and genetics. *3 sem. hrs.*

BIO 538L. POPULATION BIOLOGY LABORATORY: Field and laboratory exercise to accompany BIO 538. *1 sem. hr.*

BIO 540L. PHYSIOLOGY OF HIGHER PLANTS LABORATORY: Laboratory concerned with uptake and transport of materials, energy metabolism and growth in higher plants. *1 sem. hr.*

BIO 546. PLANT DEVELOPMENT: Study of the major organ systems of the vascular plants with emphasis on the nature of their cell types and tissue composition and their patterns of development. *3 sem. hrs.*

BIO 546L. PLANT DEVELOPMENT LABORATORY *1 sem. hr.*

BIO 550. BIOMETRICS: The design and analysis of experiments in quantitative Biology. Parametric and nonparametric analyses of both laboratory and field-generated data sets. *3 sem. hrs.*

BIO 552. BIOLOGICAL INSTRUMENTATION: The theory of separation, measuring and data handling techniques, and their applications to modern Biology. Required of all graduate students. Two hours lecture, and two, two-hour laboratory periods per week. *4 sem. hrs.*

BIO 553. BIOLOGICAL INSTRUMENTATION: A continuation of BIO 552. *4 sem. hrs.*

BIO 555. LABORATORY TECHNIQUES (TOPIC): Advanced treatment of new techniques and instrumentation used in specialized areas of Biology. Changes with advances in a specialty reflected in the course title. *1-3 sem. hrs.*

BIO 560. ADVANCED PLANT PHYSIOLOGY: A treatment of several areas of plant physiology based on current research literature. Since the course is taught from current journals, the topics change. May be repeated. Prerequisite: a course in plant physiology. *2 sem. hrs.*

BIO 594. MOLECULAR BIOLOGY: Theory and Practice: A course designed to introduce the student to the theory and practice of molecular biology techniques. Topics and laboratory exercises will include the enzymatic manipulation of DNA and RNA, Southern and Northern blotting, library screening, DNA sequencing, DNA amplification, and gene promoter structure and function. *3 sem. hrs.*

BIO 596. CURRENT BIOLOGY PROBLEMS: The consideration of recent developments in biological thought and procedure. By permission of chair only. *1-3 sem. hrs.*

BIO 599. THESIS: Research for the master's degree. *3-6 sem. hrs.*

BIO 601. SPECIAL TOPICS: The development, presentation, and discussion of topics in specialized areas of biology. Required of all graduate students each semester. *1 sem. hr.*

BIO 699. DISSERTATION: Research for the doctoral degree. *3-6 sem. hrs.*

Department of
CHEMISTRY (CHM)*

Albert V. Fratini,
Chair of the Department

The Department of Chemistry offers graduate programs leading to the Master of Science in Chemistry.

**At this time, students are not admitted into the program.*

CHEMISTRY PROGRAM

The purpose of the Master's program in Chemistry is to present a rigorous

approach to modern theories in Chemistry and to increase the desire and potential for fundamental research through a program of literature search and laboratory experimentation.

Written examinations are given to assist the student and advisor in formulating the student's program.

ASSISTANTSHIPS

Teaching assistantships normally requiring a maximum of 9 hours of laboratory instruction per week are available. The stipend for a 9-12 month appointment is supplemented by tuition remission for graduate course work. Appointment as a teaching assistant requires fluency in spoken English. Research assistantships in selected areas are sometimes available. Current availability may be ascertained by contacting the Chemistry Department.

ADMISSION REQUIREMENTS

The undergraduate prerequisites are the minimum requirements specified by the American Chemical Society. Those students who have graduated from A.C.S.-approved schools will have fulfilled these requirements. Others may have to take certain courses concurrently from the undergraduate program to meet A.C.S. requirements. Complete, current Graduate Record Examination (GRE) scores, including the Advanced Chemistry examination, are recommended for all applicants and are required of all international students.

PROGRAM REQUIREMENTS

Normally 30 semester hours are required for the Master of Science. These include 21-24 semester hours of course work and 6-9 semester hours of research. The course work hours must include at least three semester hours in each of the major fields of organic, physical, and inorganic Chemistry. The student and advisor decide upon the remainder of the program. Electives in other departments may be chosen with the approval of the Chemistry department chair.

All candidates for the Master of Science are required to submit proof of their ability to do independent work. Normally this proof takes the form of a thesis. Additional course work may be substituted if the student has previously demonstrated research proficiency commensurate with the Master's degree as judged by the department.

BIOCHEMISTRY OPTION

This option is designed for students planning careers in Biochemistry or the medical sciences. Those who want to specialize in Biochemistry should have undergraduate preparation in general, analytical, organic, and physical Chemistry. Applicants with an undergraduate degree in Biology together with a sufficient background in Chemistry are ideally suited for this program. The degree will require 30 semester hours, of which 21-24 semester hours are from approved course work and 6-9 semester hours are from thesis research.

COURSES OF INSTRUCTION

CHM 504. SPECIAL TOPICS IN THEORETICAL CHEMISTRY: A treatment of topics selected from those normally surveyed in a one-year undergraduate course in Physical Chemistry such as electrochemistry, symmetry, spectroscopy, polymers, or others. Prerequisites: CHM 304, MTH 218 or equivalents. *3 sem. hrs.*

CHM 507. SPECTROSCOPIC IDENTIFICATION OF ORGANIC COMPOUNDS: The use of nuclear magnetic resonance, infrared, and mass spectrometry in elucidating structures. Emphasis on interpretation and integration of spectral data in problem solving. Prerequisites: CHM 314, 314L or equivalent. *1 sem. hr.*

CHM 512. INTERMEDIATE ORGANIC CHEMISTRY: Modern theory of organic Chemistry and reaction mechanisms. Prerequisite: CHM 314 or equivalent. *3 sem. hrs.*

CHM 515. ANALYTICAL CHEMISTRY: Methods of analysis based on

modern instrumentation including chemical, electrical and spectral methods. Prerequisites: CHM 201, 304 or 302. *2 sem. hrs.*

CHM 515L. ANALYTICAL CHEMISTRY LABORATORY: A laboratory course to accompany CHM 515. *1 sem. hr.*

CHM 517. INORGANIC CHEMISTRY: An introductory course. The fundamentals of modern inorganic chemistry including atomic structure, principles of structure and bonding, acid-based chemistry, periodicity, coordination compounds, nonaqueous solvents, electro-chemistry, molecular symmetry, and the chemistry of representative elements. *3 sem. hrs.*

CHM 539. SPECIAL TOPICS IN PHYSICAL CHEMISTRY: Topics of current interest in areas such as chemical instrumentation, electronics, physical biochemistry, macromolecular Chemistry, and spectroscopy *3 sem. hrs.*

CHM 541. TOPICS IN PHYSICAL CHEMISTRY: Modern aspects of physical chemistry, which may include the solid state, electrochemistry, or mathematical methods of physical chemistry. *3 sem. hrs.*

CHM 544. COORDINATION CHEMISTRY: Properties of transition metal ions, reaction mechanisms in coordination compounds, bioinorganic systems, electron transfer mechanisms, and the experimental tools common to coordination Chemistry. Prerequisite: CHM 517 or equivalent. *3 sem. hrs.*

CHM 546. SPECIAL TOPICS IN MODERN ANALYTICAL CHEMISTRY: Modern analytical methods. Subject matter may include NMR, EPR, electroanalytical methods, GLC, mass spectrometry, IR and Raman spectroscopies, visible and ultraviolet spectrophotometric methods, X-ray techniques, ESCA and Auger spectroscopies, atomic absorption, and fluorescence. *3 sem. hrs.*

CHM 550. SPECIAL TOPICS IN ORGANIC CHEMISTRY: Modern physical organic Chemistry, spectroscopy, photochemistry, molecular

rearrangements, stereochemistry, and natural products. *3 sem. hrs.*

CHM 551. GENERAL BIOCHEMISTRY I: Discussion of the chemistry and biochemistry of carbohydrates, amino acids, proteins, and nucleic acids, including health-science and methodologic aspects. Descriptions of enzymology, protein purification, and carbohydrate metabolism related to such topics as bioenergetics, membranes, and disease processes. Prerequisites: CHM 201, 314. *3 sem. hrs.*

CHM 552. GENERAL BIOCHEMISTRY II: Discussion of selected topics in bioenergetics, and metabolism of lipids, amino acids, porphyrins, nucleic acids, and proteins. Current aspects of nutrition, biochemical genetics, endocrinology, regulation, and genetic engineering addressed and related to health-science topics as time permits. Prerequisite: CHM 551. *3 sem. hrs.*

CHM 553. TOPICS IN BIOCHEMISTRY: Topics of current interest in biochemistry. Prerequisite: CHM 551 or 552 or permission of instructor. *1-3 sem. hrs.*

CHM 554. DIRECTED READINGS *1-3 sem. hrs.*

CHM 560-561. RESEARCH *0-9 sem. hrs.*

CHM 562L. INTRODUCTORY BIOCHEMISTRY LABORATORY: Spectrophotometry; pH and dissociation; thin-layer, column, and paper chromatography; enzymology and enzyme purification, quantitative and qualitative techniques for studying proteins, amino acids, lipids, carbohydrates, and nucleic acids; and radioisotopic tracer techniques. Corequisite: CHM 551 or special permission of instructor. *2 sem. hrs.*

CHM 590L. SCIENTIFIC GLASS-BLOWING: Theory and practice of glass working. Under the supervision of a professional glassblower, students learn to make several standard seals and fabricate pieces of glass apparatus. Enrollment limited. One 3-hour laboratory each week. Prerequisite: Permission of the chairperson. *1 sem. hr.*

NOTE: The following courses are not applicable to the Master's degree in chemistry.

CHM 502. PHYSICAL CHEMISTRY: A concise treatment of theoretical Chemistry. Prerequisite: CHM 124.
3 sem. hrs.

CHM 525-526. PRINCIPLES OF ORGANIC CHEMISTRY: An introduction to the fundamentals of Organic Chemistry. Prerequisite: CHM 124. *3 sem. hrs. each term*

CHM 525-526L. PRINCIPLES OF ORGANIC CHEMISTRY: Laboratory course to accompany CHM 525-526. *One three-hour laboratory per week*

NOTE: The following courses apply only to the Biochemistry option.

CHM 527-528. THEORETICAL PRINCIPLES OF CHEMISTRY: Prerequisite: CHM 201 or equivalent. Corequisite: MTH 218.
3 sem. hrs. each term

CHM 527-528L. THEORETICAL PRINCIPLES OF CHEMISTRY: Laboratory course to accompany CHM 527-528. *One three-hour laboratory per week. 1 sem. hr. each term*

Department of **COMMUNICATION (COM)**

Thomas Skill, Chair of the Department
Teresa Thompson, Program Director

The graduate program of the Department of Communication leads to the Master of Arts.

The focus of the Department of Communication is upon symbolic processes in human communication. Such a focus is distinguished by the varied contributions of scholars in rhetoric, communication theory, and mass communication. A solid grounding in research, theory, message

development and analysis will prepare graduates to assume positions in education, business, mass media, government, and professional organizations.

The master's student should begin study in the Department of Communication with the standard undergraduate competencies. If the student lacks such competencies, they should be developed prior to attempting the regular master's program. The master's program is designed to develop graduates with a variety of competencies of a more advanced nature than those possessed by the undergraduate and/or to provide a firm foundation for students who are encouraged to continue on for a Ph.D. Accordingly, persons receiving the master's degree from the Department of Communication must:

1. Have a thorough grounding in theories relevant to a particular area of interest, and have the ability to apply this knowledge to the solution of a variety of communication-related problems;
2. Have exposure to a variety of research and analytical or critical methods, have a basic understanding of these, and have demonstrated a working command of at least one methodology; and
3. Have a basic knowledge of and appreciation for approaches to the study of communication from a variety of perspectives.

ASSISTANTSHIPS

Graduate assistantships are available. The assistantships carry a stipend and a tuition remission for courses required for the degree. The assistantships are for 1 year with possible renewal for 1 additional year. No student can receive an assistantship for more than 2 academic years.

Assistantships in the department are, for the most part, teaching assistantships. However, some assistantships may carry a reduced teaching load when combined with other departmental responsibilities such as faculty research assistance.

The minimum requirements for assistantship in the department are:

1. The equivalent of an academic minor in communication and related areas or a demonstrated successful professional background in a communication-oriented occupation for a minimum of 3 years.
2. A 3.0 undergraduate cumulative point average (or the equivalent) and a 3.0 in the academic major or minor (Communication).
3. Admission to the master's degree program in Communication on regular status.

ADMISSION REQUIREMENTS

1. The student seeking admission must have a bachelor's degree from a recognized institution of higher learning. In case of seniors who have almost completed undergraduate requirements, the graduate committee may permit the taking of graduate courses which will be applied to the master's degree only after the appropriate bachelor's degree has been awarded.
2. The student seeking admission should have a 3.0 undergraduate cumulative point average (or the equivalent). The graduate committee will recognize the potential merits of professional experience and/or maturity as they review an applicant's credentials.
3. The student seeking admission must take the Graduate Record Examination (GRE).
4. The student seeking admission will ordinarily have completed those studies required to develop the level of competency in communication necessary for pursuing the master's degree. The graduate committee will recognize demonstrated professional accomplishments in a communication field.

NOTE: Students who do not meet the above requirements and yet wish to

pursue the master's degree in the Department of Communication may, at the discretion of the graduate committee, be admitted on conditional status. Conditional status usually means completing 12 hours of graduate courses (including core courses COM 501, COM 536) with grade point average of 3.0 or better. When the conditions are met, the student should request the department graduate director's office to send notification to the University Office for Graduate Studies and Research, who will then grant the student regular status. Such conditions should be met in one year. A student may not become a candidate for a degree while in conditional status.

5. Graduate credit from other accredited institutions of higher learning will be reviewed by the graduate committee. Transfer of such credit may be accepted up to a maximum of six semester hours.

ADMISSION PROCEDURES

It is the applicant's responsibility to supply the following information necessary for a completed application:

1. The completed application form. Application forms may be obtained from the Office for Graduate Applications & Records at the University of Dayton (300 College Park, Dayton, Ohio, 45469-1619).
2. Official transcripts of all undergraduate schooling (and graduate schooling where appropriate).
3. At least three letters of recommendation (at least two of these should be from professors familiar with the student's academic work).
4. Scores on the Graduate Record Examination (GRE).
5. Statement of goals: Please respond to the following:
 - Question one: What topics, problems, or areas of communication do you wish to

investigate in your master's program?

- Question two: What education and personal experiences have led you to want to investigate these topics, problems, or areas at the University of Dayton?
- Question three: What are your career goals?

ADVISOR SELECTION

The advisor serves the student in planning the program of study, supervising the administration of comprehensive examinations, and (when appropriate) directing the student's thesis project.

The Graduate Program Director serves as a temporary advisor to assist the student with initial enrollment and program planning. The student should choose a permanent advisor from among available communication faculty before the middle of the second semester (or completion of 9 credit hours). The student must gain approval from the faculty member and the Program Director before the faculty member will be appointed as permanent advisor. Subsequent changes of advisor require approval of the Program Director.

After consultation with the permanent advisor, the student should submit a proposed program plan (on the forms provided by the Program Director) no later than the end of 12 credit hours. A copy of the proposed program should be on file in the Program Director's office.

The advisor will conduct a mid-program review of the student's progress toward the degree. The time of this review should be specified during the initial program planning meeting; however it should take place by the time fifteen credit hours are completed.

PROGRAM OPTIONS AND REQUIREMENTS

General Requirements

The department's master's program is based on the satisfactory completion of

a minimum of 36 semester hours of credit distributed as follows:

- I. At least 24 hours of credit must be taken within the Department of Communication.
- II. Up to 12 hours of credit may be scheduled outside the department (with approval of advisor).
- III. Core courses: COM 501 and COM 536. (Program B students also complete COM 503).
- IV. Three or six hours of research credit is scheduled by each master's candidate writing the thesis.

NOTE: It is expected that each master's student will enroll in the required core courses as early as possible.

Demonstration of satisfactory progress toward the degree includes the requirement that students maintain a minimum average of B (3.0) in coursework. Students who fail to meet this requirement are either placed on academic probation or dropped from the program. Students are permitted no more than six semester hours with grades of C or lower. Students who fail to meet this requirement are dismissed from the program.

PROGRAM A— COMMUNICATION NON-THESIS OPTION

Program A consists of 36 credit hours of course work of which 24 credit hours must be from the Department of Communication. Students who choose Program A are required to successfully complete COM 501 and COM 536. These required courses should be completed as early as possible in the academic program. Students in Program A are encouraged to complete a capstone project or independent study in their final semester of course work.

All students choosing Program A must take the comprehensive examination during their last semester of classes. The comprehensive examination consists of a minimum of six hours of written examinations and a one hour oral defense. (See the subsequent section on Comprehensive Examinations.)

PROGRAM B— COMMUNICATION THESIS OPTION

Program B consists of 30-33 credit hours of course work, 18 credit hours of which must be from the Department of Communication including COM 501, COM 503, COM 536. In addition, students complete 3-6 credit hours of Thesis (COM 598 and/or COM 599). Students choosing to write a thesis must complete the comprehensive examinations during their final term of course work. (See the subsequent section on Comprehensive Examinations.)

The student will select a thesis committee consisting of the advisor and at least two other members of the faculty. (One of the faculty members may be from outside the Communication Department.) The preparation of a thesis prospectus may begin once a student has formed a thesis committee. Students should register for 3 credit hours of Thesis (COM 598) during the term that the prospectus will be presented to the thesis committee for approval.

The thesis should report original research on some important question relevant to the study of communication. The prospectus should also include a detailed description of the methods to be used in the research as well as suggested analytic techniques.

The prospectus will be developed in consultation with the thesis advisor, although the student must have the methodological competence necessary to complete the proposed project. Once the prospectus is approved by the advisor, it must be presented to the thesis committee for approval. The completed prospectus will constitute the first half of the thesis and serves, essentially, as a contract between the student and the committee.

NOTE: The prospectus should be completed within six months of passing the comprehensive exams.

After the prospectus has been approved, the student may register for an additional three hours of thesis credit while completing the thesis

(COM 599). The student will then collect and analyze the data required to answer the questions raised in the prospectus. Once this has been completed, the prospectus will become the first half of the thesis, followed by a chapter reporting the results of the study and a chapter discussing the implications of those results. The thesis will be revised until the advisor considers it satisfactory, at which time it will be presented to the members of the thesis committee by the student, who will orally defend the thesis in an examination conducted by the thesis committee. The master's degree is not completed until the thesis has been approved by the committee.

Should a student fail the final oral defense, the thesis may be defended again, provided the student's thesis committee recommends a second attempt. The second attempt to defend the thesis will be final. Failure of the second oral defense will require a majority vote of the student's thesis committee.

PROGRAM C— COMMUNICATION/ INTERDISCIPLINARY

Courses in business administration, English, psychology and political science have been designated for Communication/Interdisciplinary study leading to the Master of Arts.

Students take 36 semester hours of course work; 24 of those hours must be in communication and 12 of those hours in one of the interdisciplinary areas. Students are required to write a comprehensive 6-hour examination over their communication and interdisciplinary course work. The examination cannot be taken until students have successfully completed 27 semester hours of course work. The oral examination is given after satisfactory completion of the written examination. Students will prepare for the oral examination by consulting the examination committee concerning performance on the written examination. (See subsequent section on Comprehensive Examinations.)

COMPREHENSIVE EXAMINATIONS

After consultation with the Program Director and the advisor, the student selects faculty members (with their approval) to form an examination committee. The examination committee writes the examination questions, evaluates the student's written answers, and conducts the oral examination. Normally, at least three faculty write questions and evaluate the comprehensive exams. The advisor may or may not participate in the writing and evaluating of exam questions. One of the members of the examination committee may be from outside the Department of Communication. The advisor administers the examination.

Comprehensive examinations consist of at least 6 hours of written examinations and a one-hour oral defense. The form and content of the exams are determined by the advisor and the faculty examination committee.

WRITTEN EXAMINATIONS

The written examinations cover the course work completed by the student including both research methods and communication theory. The particular topic areas covered by the examination, and the number of hours of examinations devoted to each topic area, are determined by the student, the advisor, and the examination committee.

The advisor may administer the exam as take-home or in-house. Take-home examinations will generally allow the student one week for completion and will require fully cited and extensively discussed work. This exam must be typed according to APA style. The in-house exam will be written without notes, at a time and place specified by the Program Director. Specific resource materials may be permitted only if indicated by the examiner on the test question.

Generally, students will write for one faculty examiner per day; three examiners would mean a three-day exam. Weekend writing days can be arranged for part-time students. The advisor, in consultation with the

examination committee and the Program Director, may alter this requirement.

Students failing a part of the written examination may retake that part again, if so recommended by the advisor and examination committee. In re-examination, the examiner may ask a new question in the same content area or require that the same question be rewritten. Should the student fail the rewrite of a question, the examination committee may require one or both of the following procedures prior to the scheduling of an oral defense:

1. If the student is weak in a specific content area, the committee may prescribe taking or retaking of a specific course or courses to develop competency in that area.
 - (a) After successful course completion, the student will be permitted to rewrite the exam in the area/s of weakness.
 - (b) A student failing the written question again may be asked by the committee to complete option #2.
2. If the student is weak in a specific content area, the committee may require a major research paper on the weak topic.
 - (a) The paper will require a committee-approved proposal prior to writing. All revisions to the proposal must be approved by the committee before the paper is written.
 - (b) The written paper must be submitted for approval and all revisions made before an oral defense is scheduled.
 - (c) Normally, one year is permitted to complete and defend this paper. Failing to complete this requirement within that time, the student will be dismissed from the program. Only extreme circumstances will permit an extension of this time frame.

ORAL EXAMINATION

After satisfactory completion of the written examinations, the students will defend their answers in an oral examination. Students prepare for the oral examination by consulting the advisor

and examination committee concerning performance on the written exam.

Under extreme circumstances, an oral exam may be retaken once, only if recommended by the committee. Generally, prior to retaking the oral exam, the student must complete either additional course work or a research paper. A student who has already done additional classes and the research paper will be dismissed from the program. Failure of the second oral exam will result in dismissal.

COURSES OF INSTRUCTION

COM 500. COMMUNICATION COLLOQUIUM: A colloquium providing an introduction to communication studies. Presentation of faculty and graduate student research; critical discussion of current theory, issues and trends in communication studies. Topics vary. May be repeated up to three times. Credit/no credit grading. *1 sem. hr.*

COM 501. COMMUNICATION RESEARCH AND METHODS: Introduction to the study of communication research and methods. Required course for all communication graduate students. *3 sem. hrs.*

COM 502. RHETORICAL CRITICISM: Critical survey and application of traditional to contemporary methods of rhetorical criticism. *3 sem. hrs.*

COM 503. COMMUNICATION RESEARCH SEMINAR: Focused study on the methods and process of conducting communication-related research. Builds upon fundamentals covered in COM 501. Required course for students pursuing the thesis option (Program B). Prerequisite: COM 501. *3 sem hrs.*

COM 504. PRINCIPLES OF COMMUNICATION EDUCATION: Practical application of research, theory, and principles related to communication education. Development of students' pedagogical skills and strategies. Required course for graduate teaching assistants. *1 sem. hr.*

COM 506. ETHICS OF COMMUNICATION: Investigation and application of the general ethical principles of persuasion and the special problems related to professional areas: platform and business communication, electronic and print journalism, public relations, classroom communication, and forensic behavior. *3 sem. hrs.*

COM 508. INTERPERSONAL COMMUNICATION: Focus on the theories, concepts, constructs, and research related to the process of interpersonal communication. *3 sem. hrs.*

COM 511. THEORIES OF PERSUASION: An examination of the major approaches to the study of persuasion from classical rhetorical to contemporary behavioral theorists. *3 sem. hrs.*

COM 515. LANGUAGE AND MEANING: Focuses on the origin and development of language and meaning. Comprehensive exploration of the many perspectives and theories of language and meaning. *3 sem. hrs.*

COM 517. ORGANIZATIONAL COMMUNICATION: A study of communication activities within organizations: theories and systems of organizational communication, internal communication systems, research methods, and the interface of management and communication. *3 sem. hrs.*

COM 520. PUBLIC COMMUNICATION CAMPAIGNS: Investigation of noncommercial public communication campaigns concentrating on social change or public information. Analysis and development of campaigns through mass media, organizational, group and interpersonal communication. *3 sem. hrs.*

COM 525. COMMUNICATION TRAINING & DEVELOPMENT: Explores the theories, methods, and practice of developing, instituting, and evaluating communication training and development programs. *3 sem. hrs.*

COM 526. COMMUNICATION CONSULTING: Explores the theories, methods, and practice of developing, instituting, and evaluating communication consulting programs. *3 sem. hrs.*

COM 527. SMALL GROUP COMMUNICATION: An examination of the theoretical and practical aspects of small group communication. Focus on communication as it relates to decision making, group processes, leadership and roles, and member relations. *3 sem. hrs.*

COM 530. DEVELOPMENT OF MASS MEDIA: History and analysis of the development and interdependence of mass media, print and electronic. Emphasis on its role and responsibility in political and economic progress of U.S. *3 sem. hrs.*

COM 531. DIRECTED STUDY IN COMMUNICATION: An intensive study of a specialized area of communication selected through consultation with the instructor. Permission. May be repeated for up to six hours. *1-3 sem. hrs.*

COM 536. THEORIES AND MODELS OF COMMUNICATION: Survey and analysis of current theories and models of communication. Required course for all communication graduate students. *3 sem. hrs.*

COM 537. CONFLICT MANAGEMENT: An analysis of the role of communication in the process of conflict with special emphasis on communication strategies for managing conflict. Special focus on types of conflict, conflict contexts, power, and communication style. *3 sem. hrs.*

COM 547. SEMINAR IN HEALTH COMMUNICATION: An examination of communication theory and research as it relates to health care. Issues include reassurance, the role of the patient, interviews, health organizations, the media and health, compliance, providing explanations, and health care professions frequently neglected. *3 sem. hrs.*

COM 555. PUBLIC RELATIONS: Focuses on the theoretical principles behind the current-day practice of public relations. Special emphasis on public opinion, diffusion, persuasion, problem analysis, and audience assessment within the PR context. *3 sem. hrs.*

COM 562. TOPICS IN COMMUNICATION: Selected topics in communication, for example: argumentation, listening, law and the news media, historical and contemporary public address and criticism. May be repeated when topic and instructor change. *3 sem. hrs.*

COM 571. MASS COMMUNICATION PROCESSES AND EFFECTS: An examination of the historical and current research as it relates to our understanding of the processes and effects of mass communication. *3 sem. hrs.*

COM 598/599. THESIS *3 sem. hrs.*

COM 617. ORGANIZATIONAL RHETORIC AND SYMBOLISM: Examination of discourse and symbolism as the principal communicative power relations are maintained and reproduced, member meanings are created, and organizational culture is enacted. *3 sem. hrs.*

COM 620. ELECTION CAMPAIGN COMMUNICATION: Survey of communication research and theories concerning election campaign communication including candidates, voters and the media. Analysis of campaign communication including development of appropriate research methodologies. *3 sem. hrs.*

COM 622. An examination of the foundations of modern propaganda analysis. Topics include classical rhetorical contributions to argumentative analysis; historical development of propaganda; points of propaganda analysis. Special emphasis on modern mediated propaganda from World War I to the present. *3 sem. hrs.*

COM 630. ISSUES IN INTERNATIONAL COMMUNICATION: Discussion of current issues in international communication. Possible topics include international news flow, globalization of mass media, communication and development, comparative mass media, mass media in political revolutions, democracy and terrorism. *3 sem. hrs.*

Department of
**COMPUTER
SCIENCE (CPS)**

Barbara A. Smith,
Chair of the Department
Leon E. Winslow,
Graduate Program Director

The graduate program in computer science offers a comprehensive approach to the theory and application of computer science. The graduate of the program will have:

1. a thorough grounding in the theory of computing science and have the ability to apply that knowledge to a variety of problem areas, and
2. been exposed to a variety of analytical methods and will demonstrate a basic understanding of these methods.

The program is individualized to meet each student's need and provides a firm foundation for continuing on to the doctorate or a professional career. The program accommodates both full-time and part-time students.

ASSISTANTSHIPS

Graduate assistantships are offered to qualified students in the MCS program for assisting with or teaching sections of introductory Computer Science courses and for assisting faculty with research. Competent assistants making satisfactory progress toward the degree can normally renew their assistantships for a second year. Recipients are expected to complete the requirements for the master's degree in two years. Assistants contribute half-time service of 20 hours per week. Stipends and complete tuition remission for six semester hours per term are provided. Detailed information and forms for application may be obtained from the Computer Science Department.

**ADMISSIONS
REQUIREMENTS**

The student seeking admission should have a Bachelor's degree from

an accredited institution of higher education with a cumulative grade point average of 3.00 out of 4.00. For success in the program the student should have the equivalent of at least one year of college mathematics which is normally calculus. A few of the graduate courses have, in addition to the calculus, topics such as linear algebra, statistics, and discrete mathematics as prerequisites.

For admission to the program, the student must demonstrate better than average knowledge of algorithm construction and its implementation on a digital computer in a structured procedure-oriented language, of assembly programming, and of data structures. These requirements can be met by completing the following undergraduate courses (or their equivalents): CPS 150 Algorithms and Programming I, CPS 151 Algorithms and Programming II, CPS 250 Algorithms and Programming III, and CPS 350 Data Structures and Algorithms, with a minimum cumulative grade point average of 3.2. The graduate committee of the department will recognize the potential merit of professional experience and/or maturity as it reviews an applicant's credentials.

Graduate credit from other accredited institutions of graduate learning will be reviewed by the graduate committee. Transfer of such credit may be accepted up to a maximum of six semester hours.

PROGRAM REQUIREMENTS

The degree requires 36 semester hours, 24 of which must be taken from Computer Science courses numbered 510 or above, including CPS 510, CPS 530, and CPS 536. The student must also complete a software project (CPS 595). A student may select the remaining 12 semester hours from graduate courses of other departments of the university or from other CPS courses numbered 510 or above. A minimum of a two semester sequence must be elected when courses are selected from departments other than computer science.

Each student's program requires

the advance approval of a faculty advisor and will require a series of core courses in the specific area of interest of the student. A student failing to make normal progress will be required to withdraw from the program.

APPLICATION

An application for admission to graduate studies in Computer Science may be obtained from the Office for Graduate Applications & Records, Room 117, St. Mary's Hall, University of Dayton 45469-1619. The application, a transcript of credits, and three letters of recommendation must be returned to the Office for Graduate Applications & Records.

INTERNATIONAL STUDENTS

Students from foreign countries should request information and applications for admission to graduate studies from the Office of International Services. A score of 550 or better is required on the TOEFL exam for those for whom English is a second language. A student from a foreign country seeking admission must have earned at least a bachelor's degree or its equivalent. For further details see International Students Admission.

FACILITIES

Two types of computing facilities are available to students: those provided by the university (through the Office for Computing Activities) and those provided by the Computer Science Department itself.

Specifically, the Computer Science Department has NCR Tower computers interconnected via Ethernet serving users in Anderson Center as well as other parts of the university. The two laboratories in Anderson Center house 54 NCR workstations, a number of printers and plotters, and graphic image processing equipment. In addition, the department has a third laboratory with 30 microcomputers and a fourth laboratory for digital design and

microcomputer interfacing. Several different Local Area Networks are employed in these laboratories and there are gateways from these laboratories into the university's backbone network and to internet.

The Office for Computing Activities provides general educational computing facilities to all university students. These facilities include Digital Equipment Corporation VAX computers and a variety of local and long-distance network services.

All the computers provide access to a large variety of application packages and programming languages. Around-the-clock telephone dial-up services to all systems are available to students with appropriate access equipment.

COURSES OF INSTRUCTION

Courses numbered 510 and above have specific prerequisites. It is the students' responsibility to ascertain that they possess the necessary prerequisites for the courses for which they register. Students not having the necessary prerequisites will be required to withdraw from the course.

CPS 502. COMPUTING—GENERAL SURVEY: A nontechnical introduction to the history and organization of digital computers. Survey of the diverse applications of computers in government, business, education, and the arts. Discussion of the psychological and sociological impact of the computer and information age and related ethical issues. Primarily for students in the humanities and in education. *3 sem. hrs.*

CPS 509. TOPICS IN COMPUTER SCIENCE: Lectures in special areas of interest determined by the department. May be taken more than once for additional credit when the topics or contents change. Prerequisite: permission of the department. By arrangement. *1-3 sem. hrs.*

CPS 510. SYSTEMS ANALYSIS: Process-oriented, Data-oriented, and Object-oriented approaches for systems development; comparison of various systems development life cycles; DFD

methodology for systems analysis using state-of-the-art CASE (Computer Aided Software Engineering) tools; Logical and Event analyses of DFD specifications; Tools and techniques for modeling Real-Time systems; Data Modeling; Introduction to Object-Oriented Analysis methodologies. Prerequisite CPS 350. 3 sem. hrs.

CPS 512. SYSTEMS DESIGN: Principles of design, Introduction to software design methodologies; Issues in transition from analysis to logical and physical designs; Detailed discussion of Structured Design methodology (Yourdon, Constantine, Myers); Design guidelines; Transform Analysis; Warnier/Orr and Jackson System Development (JSD) Design methodologies; Designing methodologies for Real-Time Systems; Introduction to Object-Oriented Design; CASE tools and code generators. Prerequisite CPS 510. 3 sem. hrs.

CPS 514. MANAGEMENT INFORMATION SYSTEMS: The systems approach to managing information; MIS organization within the company; application of organizational behavior to MIS; manager's view of computer systems; planning, designing, and implementing the MIS; advanced concepts of MIS. Prerequisite: CPS 510. 3 sem. hrs.

CPS 518. SOFTWARE ENGINEERING: The course explores major issues of software engineering, comparison of various manual/automated analysis and design methodologies; Testing and Quality Assurance; software metrics and configuration management; software productivity and human factors in software development; CASE tools for various phases of software development. Prerequisite CPS 350. 3 sem. hrs.

CPS 528. DISCRETE STRUCTURES: Survey of various mathematical topics with applications to Computer Science. 3 sem. hrs.

CPS 530. ALGORITHM DESIGN: Concepts of algorithms and data and their use in the systematic design, implementation, and maintaining of software systems including formal analysis and verification of systems. Prerequisite: CPS 350. 3 sem. hrs.

CPS 532. DATA STRUCTURES: Review of basic data concepts, linear lists, strings, arrays, and orthogonal lists, trees and graphs, multilinked structures, searching and sort techniques. Algorithm design, accessing methods, run time cost and efficiency. Prerequisite: CPS 530. 3 sem. hrs.

CPS 536. OPERATING SYSTEMS I: Study of operating system principles and the functions of data, job, and task management. Prerequisite: CPS 350. 3 sem. hrs.

CPS 538. OPERATING SYSTEMS II: Models and algorithms pertinent to the design of computer operating systems; concurrent processes including synchronization, communication, and deadlock problems; process and device scheduling policies, design of file systems, reliability and protection. Prerequisite: CPS 536. 3 sem. hrs.

CPS 542. DATA BASE MANAGEMENT SYSTEMS: Physical and logical organization of data files; hierarchical, network, and relational data base models; data definition language and data manipulation language of a commercial data base management system such as IDMS; query languages. Prerequisite: CPS 350. 3 sem. hrs.

CPS 543. COMPARATIVE LANGUAGES: The evolution of programming languages. The study of the concepts common to languages, constructs, organization, specification, and analysis of languages. The role of languages in software development. Prerequisite: CPS 350. 3 sem. hrs.

CPS 544-545. SYSTEMS PROGRAMMING: Analysis of compilers and their construction; programming techniques discussed in the current literature; advanced computer applications in both mathematical and nonnumeric areas. Prerequisites: CPS 530, 536. 6 sem. hrs.

CPS 552. DISCRETE EVENT SIMULATION TECHNIQUES: Simulation models; random number generation testing, special purpose simulation languages, statistical analysis of output; regenerative models; trace-driven models. Emphasis

on models related to computer operating system design and performance evaluation. Prerequisites: CPS 350, MTH 367. 3 sem. hrs.

CPS 553-554. NUMERICAL METHODS: Solution of nonlinear equations, interpolation and approximation, differentiation and integration, systems of linear equations, eigenvalues, eigenvectors, and introduction to solution of ordinary differential equations. Emphasis placed on applications. Prerequisites: CPS 132 or 150 and MTH 169. 3 sem. hrs.

CPS 555-556. NUMERICAL ANALYSIS: Functional approximation, quadrature methods, numerical solution of differential equations; matrices and large scale systems, modern iterative matrix methods; minimax approximations; data smoothing. Prerequisites: CPS 132 or 150, MTH 302, 319. 6 sem. hrs.

CPS 560. COMPUTER GRAPHICS: Types of graphic hardware and their characteristics. Overview of software and techniques used in computer graphics. Two and three dimensional graphics displays. Prerequisites: programming ability in a procedure oriented language, MTH 302, CPS 350 3 sem. hrs.

CPS 565. ADVANCED COMPUTER ARCHITECTURE: Hierarchical memory structure, cache and main memory organization; I/O processors and I/O channels; pipeline computers; array computers, multiprocessor systems and their interconnection structures. Prerequisite: CPS 346 or equivalent. 3 sem. hrs.

CPS 570. DATA COMMUNICATIONS: The study of networks of interacting computers. The analysis of distributed processing and distributed data bases. Prerequisite: CPS 346. 3 sem. hrs.

CPS 572. COMPUTER NETWORKING: A unified view of the broad field of local area and long haul networks. A survey of the state of the art. Topics covered include networking theory, design approaches, standards, topologies and protocols. Prerequisites: CPS 536, 570. 3 sem. hrs.

CPS 577-578. COMPUTER SYSTEM DESIGN: Introduction to design and analysis of combinational and sequential circuits of MSI devices to design arithmetic and other computer functions. Analysis of a specific microcomputer architecture including usage of its machine and assembler language. Interfacing of various components with computers. Prerequisites: CPS 250, PHY 207. *6 sem. hrs.*

CPS 580. ARTIFICIAL INTELLIGENCE: Presentation of theoretical concepts for Artificial Intelligence in the areas of knowledge representation and search techniques. These are examined in the context of applications for expert systems, semantic networks and robotics planning problems. Issues concerning functional programming and logic programming are also presented. Prerequisite: CPS 350. *3 sem. hrs.*

CPS 582. AUTOMATA THEORY: Finite automata, sequential machines. Turing machines, computability, existence of self-reproducing machines. Prerequisite: CPS 528. *3 sem. hrs.*

CPS 591. SPECIAL RESEARCH PROBLEMS: Individual readings and research in a specialized area. May be taken for at most 6 semester hours. Prerequisite: permission of the department. By arrangement. *1-3 sem. hrs.*

CPS 592. SPECIAL TOPICS: Lectures and/or laboratory experience in some areas determined by the department. May be taken for at most 6 semester hours. Prerequisite: permission of the department. By arrangement. *1-3 sem. hrs.*

CPS 595. SOFTWARE ENGINEERING PROJECT: Students, either individually or in small teams, must design and implement a software system carefully specified to illustrate the basic concepts and techniques of software engineering. Regular meetings are required where oral and written progress reports are presented and critiqued. May be taken for at most 6 semester hours. Prerequisite: CPS 510, CPS 530, and permission of department. *3 sem. hrs.*

Department of ENGLISH (ENG)

James P. Farrelly,
Chair of the Department
Lawrence A. Ruff,
Graduate Program Director

The English graduate program leading to the Master of Arts degree allows students to concentrate either in English and American literature or in writing.

The program accommodates both full-time and part-time students. Because it offers courses in literary studies and writing, as well as in literature and composition pedagogy, the program serves a wide variety of students, including prospective Ph.D. students in literature or writing, persons committed to teaching in secondary schools or community colleges, students pursuing greater literary understanding or research skills, and persons seeking advanced work in professional, business, technical, or creative writing.

ASSISTANTSHIPS

Graduate assistantships are offered to qualified students in the M.A. program. The assistantship is essentially an apprenticeship in teaching, and assistants gain experience in a traditional freshman composition curriculum using the writing process for basic expository, argumentative, and research essays. Competent assistants making satisfactory progress towards the degree normally renew their assistantships for a second year.

ADMISSION REQUIREMENTS

Students seeking admission must have completed studies in English and American literature, writing, or both that will enable them to pursue graduate studies with distinction. Ordinarily, students will have completed 24 semester hours in literature, composi-

tion, or both, beyond the 100 level, with a grade point average of at least 3.0.

PROGRAM REQUIREMENTS

Normally 30 semester hours are required. Every applicant in literary studies who, after completing 12 hours of graduate work, has attained a grade point average of at least 2.75 will take a Diagnostic Examination; this examination will be reviewed by the candidate's advisor, the director of the graduate program, and another member of the graduate faculty or staff. Every applicant in the writing concentration who, after completing 12 hours of graduate work, has attained a grade point average of 2.75 will begin a short Writing or Research Assignment with the approval of the student's advisor. This assignment will ordinarily be completed during the same term in which it is approved by the advisor, and the finished assignment will be assessed by the advisor, the director of the graduate program, and a third member of the graduate faculty or staff. On the basis of the Diagnostic Examination or the completed Writing or Research Assignment, as well as other materials pertaining to the student's graduate performance, the evaluating committee will make recommendations to the department chair about the candidate's graduate program. Among these recommendations will be the total number of hours that the candidate needs to complete the degree. Exceptionally well qualified students may earn the master's degree in fewer than 30 hours; students with deficiencies may be required to take up to 36 semester hours of graduate study.

ENG 601, Research and Bibliography, is required of each applicant for the degree. ENG 588, Studies in Criticism, is required of each applicant in literary studies who has not had a satisfactory undergraduate course in literary criticism. ENG 596, Composition Theory, is required of each applicant in the writing concentration. All students must take at least 12 hours of 600-level courses (including Eng 601). Graduate assistants are required

to take the one-credit course, ENG 590, Teaching of College English, during each year of their assistantship.

Because the Master of Arts is not a specialist degree, candidates must take a balanced program of courses. For students of literature, such a program will normally include a balance of early and later literature and of English and American literature. For students in the writing concentration, such a program will normally include 12 hours of writing courses and 12 hours of literary studies. Approved writing courses are ENG 505, 507, 585, 587, 592, 594, 596, 625, 627, and 629.

For students of literature, a thesis upon an approved topic, for which either 3 or 6 semester hours of credit are granted, can be accepted if the Diagnostic Examination committee has agreed. For students in the writing concentration, a writing project approved by the Graduate Committee of the department for which 3 or 6 semester hours of credit may be granted, can be accepted if the Writing or Research Assignment committee has agreed.

COURSES OF INSTRUCTION

Prerequisite for enrolling in any of the following courses for credit is at least 24 undergraduate semester hours in literature, writing, or both, above the basic skills level. The starred courses (*) may be repeated for graduate credit when the topics or contents change.

ENG 505. CREATIVE WRITING*: Supervised practice in various literary forms. Both group discussions and individual conferences and critiques. Permission of chair required.
3 sem. hrs.

ENG 507. STUDIES IN WRITING*: Special topics in composition, argumentation, technical writing, report writing, and the like. 1-6 sem. hrs.

ENG 514. MEDIEVAL ENGLISH LITERATURE: A study of the dominant types in the literature of England from the beginning to 1500.
3 sem. hrs.

ENG 515. CHAUCER: A study of the life, the times, and language of Chaucer. The main concentration is on *The Canterbury Tales* as rendered in Middle English. 3 sem. hrs.

ENG 522. EARLY RENAISSANCE LITERATURE: A survey of the literature of the sixteenth century from Thomas More to Sidney and Spenser. 3 sem. hrs.

ENG 524. SHAKESPEARE*: A study of significant aspects of Shakespeare's plays and poems. 3 sem. hrs.

ENG 532. LATER RENAISSANCE LITERATURE: A survey of the literature of the early seventeenth century from Bacon, Jonson, and Donne to Marvell, exclusive of Milton. 3 sem. hrs.

ENG 536. STUDIES IN DRAMA TO 1642*: Studies in English drama from the beginning to the closing of the theatres. 3 sem. hrs.

ENG 538. MILTON: A study of the major and minor poems and of selected prose of Milton. 3 sem. hrs.

ENG 542. STUDIES IN NEO-CLASSICAL LITERATURE*: Studies in literature from Dryden to Johnson. 3 sem. hrs.

ENG 552. ENGLISH ROMANTICISM: A study of the major poets and critics of the Romantic Age. 3 sem. hrs.

ENG 556. STUDIES IN NINETEENTH-CENTURY LITERATURE*: A study of the literature in England in the nineteenth century. 3 sem. hrs.

ENG 560. TWENTIETH-CENTURY BRITISH LITERATURE: A consideration of significant developments in modern British literature. 3 sem. hrs.

ENG 572. AMERICAN ROMANTICISM: A study of significant developments in American literature of the mid-nineteenth century. 3 sem. hrs.

ENG 576. MAJOR AMERICAN WRITERS*: An intensive comparative study of two or three American writers. 3 sem. hrs.

ENG 580. AMERICAN REALISM AND NATURALISM: A study of representative writers from the post-Civil War period in American literature. 3 sem. hrs.

ENG 584. STUDIES IN TWENTIETH-CENTURY AMERICAN LITERATURE*: A study of significant developments in American literature of the twentieth century. 3 sem. hrs.

ENG 585. HISTORY OF RHETORIC: A history of rhetoric from the classical to the modern age. 3 sem. hrs.

ENG 587. CONTEMPORARY RHETORIC*: An examination of one or more contemporary forms of argumentation and their application in writing. 3 sem. hrs.

ENG 588. STUDIES IN CRITICISM*: A treatment of significant topics in theoretical and/or practical criticism. 3 sem. hrs.

ENG 590. TEACHING OF COLLEGE ENGLISH: Discussion, instruction, and practice in the methods of teaching composition and literature. Required of and open only to assistants. 1 sem. hr.

ENG 591. STUDIES IN LITERATURE*: An analysis of selected literary problems or areas. 1-6 sem. hrs.

ENG 592. HISTORY OF ENGLISH: A study of stages in the development of the English language and of influences shaping its development from the beginning to the present time. 3 sem. hrs.

ENG 594. THE STRUCTURE OF ENGLISH: Studies in the grammatical structure of modern English in the light of historical development. Traditional and modern linguistic points of view considered. 3 sem. hrs.

ENG 596. COMPOSITION

THEORY: Study of the principal current theories of composition, with application to the teaching and evaluating of writing. *3 sem. hrs.*

ENG 599. THESIS *3-6 sem. hrs.***ENG 601. RESEARCH AND**

BIBLIOGRAPHY: An introduction to the methods and tools of literary scholarship. Required of all degree applicants. *3 sem. hrs.*

ENG 605. STUDIES IN AN

AUTHOR*: A consideration of the body of an author's work and its relationship to the life of the author. *3 sem. hrs.*

ENG 609. STUDIES IN A GENRE

OR MODE*: An intensive analysis of a significant literary form or mode. *3 sem. hrs.*

ENG 613. STUDIES IN A LITER-

ARY MOVEMENT*: An analysis of a significant literary school, group, or movement. *3 sem. hrs.*

ENG 621. STUDIES IN THE

TEACHING OF LITERATURE*: An exploration of ways to teach literature more effectively for particular students. *3 sem. hrs.*

ENG 625. STUDIES IN THE

TEACHING OF COMPOSITION*: An exploration of ways to teach writing more effectively for particular groups of students. *3 sem. hrs.*

ENG 627. PROFESSIONAL

WRITING*: Analysis of and practice in professional writing in different contexts, for example, proposal writing, evaluative report writing, and editing skills. *1-3 sem. hrs.*

ENG 629. WRITING NON-FIC-

TION*: Study of and practice in the writing of non-fiction texts, such as essays, biography, letters, diaries, travel accounts, sermons. *3 sem. hrs.*

Department of**HISTORY (HST)***

John A. Heitmann,
Chair of the Department

The Department of History through its graduate program seeks to develop in students that combination of mature judgment and scholarly competence associated with the ability to conduct research, to write effectively, and to evaluate historical conclusions and interpretations. As a secondary purpose, the program is designed to prepare students for successful careers especially in teaching and government services.

**At this time, students are not admitted into the program.*

**ADMISSION
REQUIREMENTS**

Applicants for the graduate program in history must have completed a total of 24 semester credit hours of history, and achieved a grade point average of at least 3.00 in all history courses.

ASSISTANTSHIPS

Graduate assistantships are available. The assistantships carry a stipend and tuition remission for courses required for the degree. The assistantships are for one year with possible renewal for an additional year. No student can receive an assistantship for more than two academic years.

Graduate assistants generally provide instructional service by way of grading, teaching, and counseling students under the supervision of a professor. They may also be required to provide research services. In the second year of an assistantship, graduate students may be allowed to teach survey courses.

PROGRAM REQUIREMENTS

A research seminar (HST 601) is required of all students. In addition, the candidate must take at least three other 600-level courses (one of which must

be a graduate seminar [HST 610-680]). No more than two independent study courses (HST 696) may be taken with the same professor.

Up to six semester hours of work may be taken outside the History Department with the approval of the chair.

There is a written examination covering the minor field and an oral examination covering the major area. For details about these examinations and on the fields examined, consult the most recent "Graduate History Information Sheet" in the History Department's office.

A proficiency examination in a foreign language is required of all graduate work. The student may choose to show competence in any foreign language that is pertinent to the major program.

The master's program may be completed under either of the two following options:

Option A

Thirty semester hours of acceptable course work and research are required. These must include three semester hours for the research seminar (HST 601), six semester hours for the thesis (HST 699), and at least nine semester hours earned in other 600-level courses (one of which must be in a graduate seminar [HST 610-680]).

The thesis should be 80 to 160 pages in length, and stylistically it should conform to Turabian. Three years from the time it is begun are to be allowed for the completion of the thesis, though, in case of extenuating circumstances, the time allotment can be extended. Three copies of the thesis are required, and approval is by the director and two readers chosen by the director.

An oral comprehensive examination in the field of the thesis is taken concurrently with an oral examination on the major area chosen by the student. These oral examinations are taken after the student has successfully passed a written examination in the minor field.

Option B

Thirty-three semester hours of acceptable course work are required, including three semester hours for the research seminar (HST 601) and at least nine semester hours earned in other 600-level courses (one of which must be a graduate seminar [HST 610-680]). The student does not write a thesis. Written and oral examinations in the major and minor areas chosen by the student are taken after the completion of all required course work.

COURSES OF INSTRUCTION

For the convenience of teachers and other employed persons, courses will be offered in the late afternoon and evening hours except during the third term, second session, when they will be offered primarily in the morning hours.

Courses numbered in the 500s appear also in the undergraduate Bulletin. Enrollment is open to both graduate students and advanced undergraduate students. See the Department's "Graduate History Information Sheet" for methods used to evaluate graduate work in such double-numbered courses. Only double-numbered courses given in the evening have a high proportion of graduate students. Courses numbered in the 600s are restricted to graduate students. The particular emphasis of 600-level courses will be announced each term in the "History Course Descriptions" bulletin found in the History Department's office. These courses may be repeated for graduate credit when topics and content change. HST 601 (Graduate Research Seminar) is required of all students.

HST 502. MAIN CURRENTS IN ANCIENT HISTORY: Aspects of the civilizations of ancient Near Eastern countries, Greece, and Rome selected because of their integration into Western civilization. Emphasized topics: Hebrew world view and value system, Greek democracy, Roman political and social institutions.
3 sem. hrs.

HST 505. MEDIEVAL EUROPE: The development of European history from the 4th to the 14th century: birth of the Middle Ages; development of Christianity; Byzantine, Islamic, and Carolingian Empires; feudalism; Crusades; rise of universities; birth of national cultures.
3 sem. hrs.

HST 507. RENAISSANCE AND REFORMATION: The development of European history from the 14th century to the middle of the 17th. Emphasis on the economic, political, social, and religious aspects of the Renaissance, Protestant Revolution, and Catholic Reformation.
3 sem. hrs.

HST 511. ERA OF ABSOLUTISM, ENLIGHTENMENT: Intellectual and cultural developments between the later Reformation and the era of the French Revolution, with emphasis on political, economic, and social trends of the Old Regime.
3 sem. hrs.

HST 512. FRENCH REVOLUTION AND NAPOLEON: Ideological, economic, social, and political background of the French Revolution; analysis of the revolutionary governments; the resulting international wars; the rise and fall of Napoleon.
3 sem. hrs.

HST 515. SOVIET UNION SINCE 1917: A detailed survey and analysis of the U.S.S. R. from the Revolution of 1917 to the present.
3 sem. hrs.

HST 516. EUROPEAN MILITARY HISTORY: Survey of warfare on the European continent from classical Greece through World War II emphasizing the military's role in society, military institutions, organizations, weapons, and campaigns.
3 sem. hrs.

HST 517. AMERICAN MILITARY HISTORY: Survey of American military affairs from early settlement through Vietnam. Military, naval and air campaigns will be examined.
3 sem. hrs.

HST 519. MODERN FRANCE: French history from the Bourbon Restoration to the present, emphasizing political, socio-economic, and cultural developments.
3 sem. hrs.

HST 520. MODERN ITALY: Italian history from 1815 to the present stressing national unification, the role of the church, rise of fascism, post-World War II and contemporary issues and new alignments.
3 sem. hrs.

HST 521. MODERN GERMANY: Study of the development of the German nation from 1848 through the period of unification, Bismarck, William II Weimar, the Third Reich, the post-World War II Germanies, to the present.
3 sem. hrs.

HST 523. HISTORY OF LONDON: Study of the evolution of London from a small Roman town to the world's first industrial metropolis. Particular attention to social and environmental conditions and the life of the people.
3 sem. hrs.

HST 524. ENGLISH CONSTITUTIONAL AND LEGAL HISTORY: Study of the origins and development of common law and parliamentary government in England from the Saxon folkmoot to modern representative government.
3 sem. hrs.

HST 526. TUDOR-STUART ENGLAND: Economics, diplomacy, society, and culture in England from 1485 to 1714. For the Tudor period, emphasis on the development of the national state, royal absolutism, and the Reformation; for the Stuart period and Cromwellian Interregnum, the evolution of the constitutional question.
3 sem. hrs.

HST 528. MODERN ENGLAND—1815 TO PRESENT: The development of England as an industrialized nation and as a 19th century empire; the results of industrialization, urbanization, and loss of empire due to two world wars.
3 sem. hrs.

HST 538. THE MIDDLE EAST, NINETEENTH AND TWENTIETH CENTURIES: Survey of the Ottoman Empire, Iran, Egypt, and the modern states of the Middle East in international politics.
3 sem. hrs.

HST 540. MODERN CHINA AND JAPAN: In-depth study of the economic, political, social, cultural, and foreign relations developments of modern China and Japan from the 18th century to the present.
3 sem. hrs.

HST 545. KOREAN AND VIETNAM WARS: In-depth study of the two most important wars fought by the United States after World War II. Examines the wars in the context of America's changing global role and policy since 1945. *3 sem. hrs.*

HST 550. THE FOUNDING OF AMERICA: Foundations of American nationality and democratic growth under the British colonial system, with special attention to the economic, political, social and cultural life of the era. *3 sem. hrs.*

HST 554. THE AGE OF JEFFERSON AND JACKSON: The range of historical, cultural, social, and political trends traditionally associated with the presidencies of Jefferson and Jackson; the period from the 1790s to the 1850s. *3 sem. hrs.*

HST 555. THE AMERICAN SOUTH: Studies the role of the South in American History. *3 sem. hrs.*

HST 556. CIVIL WAR AND RECONSTRUCTION: Remote and immediate causes of the Civil War, especially from 1850 to 1861: problems of North and South during the war; consequences of the war, efforts to create a new Union, 1865-1877; problems resulting from those efforts. *3 sem. hrs.*

HST 557. CONTEMPORARY LATIN AMERICA: A survey of modern trends in Latin America from the late 19th century to the present with a special emphasis on United States-Latin American relationships. *3 sem. hrs.*

HST 560. U.S. LEGAL AND CONSTITUTIONAL HISTORY I: From colonial beginnings through Reconstruction. The first semester of a year's sequence that analyzes the major developments in American legal and constitutional thought and institutions. Emphasis on the evolution of the U.S. Constitution, constitutional theory and practice, and the legal profession. *3 sem. hrs.*

HST 561. U.S. LEGAL AND CONSTITUTIONAL HISTORY II: From the Gilded Age to the present. Continuation of HST 560. Prerequisite: HST 560. *3 sem. hrs.*

HST 565. HISTORY OF AMERICAN BUSINESS: Historical study of the evolution of modern capitalism from the colonial period to the present. *3 sem. hrs.*

HST 566. SCIENCE, TECHNOLOGY, AND THE MODERN CORPORATION: Historical study of the emergence of twentieth century science-based industry. *3 sem. hrs.*

HST 570. HISTORY OF THE COLD WAR: A study of the origins and development of the Cold War from the 1940s to the present. *3 sem. hrs.*

HST 572. SOUTHERN APPALACHIA: A study and appraisal of the internal and external historical forces that have shaped the Southern Appalachian region. *3 sem. hrs.*

HST 573. THE AGE OF EXCESS AND REFORM: U.S., 1877-1920: Analysis of the development of the United States as an urban-industrial nation and world power and efforts to maintain traditional political, social, and economic forms and values amidst rapid change. *3 sem. hrs.*

HST 576. BETWEEN THE WARS: Intensive study of United States History from 1919 to 1941, emphasizing Normalcy, the Depression, the evolving New Deal, and the approach to World War II. *3 sem. hrs.*

HST 577. CONTEMPORARY AMERICAN HISTORY: Diplomatic and domestic history of the United States since the beginning of World War II, including the War, wartime conference diplomacy, Russia and the Cold War, cultural trends of mid-century, social equality, and the politics of protest. *3 sem. hrs.*

HST 580. HISTORY OF AMERICAN DIPLOMACY: An analytical study of America's foreign relations from the founding of the Republic through the "imperial period" to the Cold War. *3 sem. hrs.*

HST 582. HISTORY OF MEXICO: Mexico since 1820, with emphasis on the revolution of 1910 and the struggle for democracy. Consideration of diplomatic and cultural relations between Mexico and the U.S. *3 sem. hrs.*

HST 584. CARIBBEAN SINCE 1801: The cultural, social, economic, and political history of the islands and the northern shore of South America in modern times, stressing areas that have gained independence or autonomy. *3 sem. hrs.*

HST 590. STRATEGIES OF HISTORIANS: Seminar investigating the various intellectual processes by which historians have approached particular historical questions. A wide sampling of the works of representative historians is supplemented by analyses of their methodologies and philosophies of history. *3 sem. hrs.*

HST 600. HISTORIOGRAPHY: A study of the principal historians and the chief contributions to the development of historical writing. Some familiarity with historical method required in research papers. *3 sem. hrs.*

HST 601. GRADUATE RESEARCH SEMINAR: Investigation and synthesis of primary research materials in the student's field of concentration. The seminar is unified around methodological solutions to problems in research and writing. Required of all students. *3 sem. hrs.*

HST 610. STUDIES IN EARLY EUROPEAN HISTORY *3 sem. hrs.*

HST 620. STUDIES IN MODERN EUROPEAN HISTORY *3 sem. hrs.*

HST 631. STUDIES IN AFRICAN HISTORY *3 sem. hrs.*

HST 632. STUDIES IN MIDDLE EASTERN HISTORY *3 sem. hrs.*

HST 640. STUDIES IN ASIAN HISTORY *3 sem. hrs.*

HST 660. STUDIES IN U.S. HISTORY *3 sem. hrs.*

HST 665. STUDIES IN COMPARATIVE HISTORY *3 sem. hrs.*

HST 680. STUDIES IN LATIN AMERICAN HISTORY *3 sem. hrs.*

HST 696. SPECIAL STUDIES: Tutorial readings or research in special fields. By permission of chair only. *1-3 sem. hrs.*

HST 699. THESIS *1-3 sem. hrs.*

**Department of
MATHEMATICS
(MTH)**

Thomas E. Gantner,
Chair of the Department

Graduate study in the Department of Mathematics offers students the opportunity to acquire skills in areas normally pursued after the completion of the bachelor's degree. Three different programs leading to the following degrees are available:

- **Master of Science in Applied Mathematics**, This program is applied and interdisciplinary in nature; it may include components from Computer Science and Engineering in addition to a concentration in Applied Mathematics.
- **Master of Science in Teaching (MST)** with a concentration in Mathematics. See also Joint Programs under School of Education.
- **Master of Science in Mathematics**, with emphasis on various applications or pure Mathematics.*

ASSISTANTSHIPS

Financial assistance is available to qualified students in the form of graduate teaching and research assistantships. A graduate assistant receives a stipend plus tuition remission. Most graduate assistants require two years to complete the work for a master's degree.

MASTER OF SCIENCE IN APPLIED MATHEMATICS

The primary objective of this program is to train students to do professional work in the applications of mathematics. The program strives to provide both a background in math-

ematics and an ability to relate mathematics to problems encountered in applications. Students will have the opportunity to gain experience in mathematical modeling techniques and to work on a semester or year-long project.

ADMISSION REQUIREMENTS

Applicants should have a bachelor's degree in some technical area such as engineering, computer science, physics, or mathematics and have at least a 2.8 average on a 4.0 scale. Individuals not having these qualifications may be admitted on a conditional basis if there are sufficient reasons to believe that they will succeed in the program.

Prerequisites include basic undergraduate skills in mathematics and computer science. In particular a student should have taken an undergraduate calculus sequence and a course in elementary differential equations. An understanding of the properties of matrices and some experience with the basic procedures of statistics is expected. The student should have a working knowledge of an advanced programming language and have some experience with numerical analysis. Any individual deficient in some prerequisite area would be permitted to take courses to resolve this deficiency during the first year of study in the Applied Mathematical Systems program.

PROGRAM REQUIREMENTS

The program consists of 30 hours of course work plus at least 3 hours devoted to a research project in the Mathematics Clinic (MTH 541). At least 18 hours of these courses should be taken from the offerings of the Mathematics Department. At most 6 hours of approved 400-level courses may be part of the student's program. The core areas required of all students in the program are as follows:

- Semester Hours*
- 1) Real and Complex Analysis - MTH 430, 521, or 573 and MTH 431 or 525 6

- 2) Numerical Analysis - MTH 555 or 556 3
- 3) Differential Equations - MTH 531 or 535 3
- 4) Linear Algebra - MTH 565 3
- 5) Mathematics Clinic (Project) - MTH 541 3-6

An individualized degree program consists of courses satisfying the five core areas, an area of concentration, and electives. The program is approved by the student's committee and program director, and is intended to satisfy the specific needs and interests of the individual. Any core course which is already part of the student's academic background may be replaced with an elective consistent with the other requirements of the program.

To satisfy the requirement of an area of concentration, a student will be required to take 12 semester hours of 500-level coursework in the selected area of concentration. Examples of areas of concentration include (but are not limited to):

- I. Differential Systems. Advanced and Partial Differential Equations (MTH 531 and MTH 535) plus 6 additional hours of mathematics courses approved by the committee.
- II. Engineering Systems. Continuum Mechanics and Theory of Elasticity (EGM 503 and EGM 533) plus 6 additional hours of engineering courses (of a mathematical nature) approved by the committee.
- III. Computational Systems. Numerical Analysis (MTH 555 and MTH 556) plus 6 additional hours of computer science courses approved by the committee.

MASTER OF SCIENCE IN TEACHING

The Master of Science degree in Teaching is offered in conjunction with and conferred by the School of Education. A graduate student in mathematics seeking the MST degree should satisfy the same admission requirements as the

Master of Science in Mathematics. The program then requires 18 hours of mathematics courses approved by the department plus specific education courses designed to satisfy state requirements. No written examination is required for this degree.

MASTER OF SCIENCE IN MATHEMATICS*

The primary goal of the program is to develop the student's knowledge of mathematical principles and methods to serve as a basis for a professional career or as a foundation for additional studies at the doctoral level.

•At this time, students are not admitted into the program.

ADMISSION REQUIREMENTS

In addition to satisfying the general admission requirements of the graduate school, an applicant must have had courses or be able to demonstrate equivalent knowledge in the following areas:

MTH 302	Linear Algebra and Matrices
MTH 361	Introduction to Abstract Algebra
MTH 430	Analysis

A student with deficiencies in these areas may be admitted into the program on the condition that these deficiencies are removed during the first year of graduate study.

PROGRAM REQUIREMENTS

Thirty semester hours are required. These may include (a) a maximum of six semester hours of approved 400-level mathematics courses, (b) a maximum of six semester hours of approved courses outside the department, and (c) a maximum of six semester hours for a thesis in special cases.

In this program, a student must successfully pass written examinations covering the content of three areas of study by his committee, as well as an

oral examination within three months of the expected date of graduation.

COMPUTING FACILITIES

Departmental microcomputers, the Mathematics and Science Computer Lab, and the University's mainframe computer are available for student use in conjunction with projects and/or course work.

COURSES OF INSTRUCTION

MTH 519-520. STATISTICAL INFERENCE: Sample spaces, Borel fields, random variables, distribution theory, characteristic functions, exponential families, minimax and Bayes' procedures, sufficiency, efficiency, Rao-Blackwell theorem, Neyman-Pearson lemma, uniformly most powerful tests, multi-variate normal distributions. *3 sem. hrs. each.*

MTH 521-522. REAL VARIABLES: The topology of the real line, continuity and differentiability, Riemann and Stieltjes integrals, Lebesgue measure and Lebesgue integral. Measure and integration over abstract spaces, L_p -spaces, signed measures, Jordan-Hahn decomposition, Radon-Nikodym theorem, Riesz representation theorem, and Fourier series. *3 sem. hrs. each.*

MTH 525. COMPLEX VARIABLES I: Analytic functions, integration on paths, the general Cauchy theorem. Singularities, residues, inverse functions and other applications of the Cauchy theory. *3 sem. hrs.*

MTH 526. COMPLEX VARIABLES II: Infinite products, entire functions, the Riemann mapping theorem and other topics as time permits. Prerequisite: MTH 525 or equivalent. *3 sem. hrs.*

MTH 531. ADVANCED DIFFERENTIAL EQUATIONS: Existence and uniqueness theorems, linear equations and systems, self-adjoint systems, boundary value problems and basic nonlinear techniques. Prerequisite: MTH 403 or equivalent. *3 sem. hrs.*

MTH 535. PARTIAL DIFFERENTIAL EQUATIONS: Classification of partial differential equations; methods of solution for the wave equation, Laplace's equation, and the heat equation; applications. Prerequisite: MTH 403 or equivalent. *3 sem. hrs.*

MTH 540. MATHEMATICAL MODELING: An introduction to the use of mathematical techniques and results in constructing and modifying models designed to describe and/or predict behavior of real world situations. Prerequisite: permission of the instructor. *3 sem. hrs.*

MTH 541. MATHEMATICS CLINIC: Student teams will be responsible for the development or modification and testing of a mathematical model designed for a particular purpose. Faculty guidance will be provided. May be repeated once for a maximum of 6 credit hours. Prerequisite: permission of the chair. *3 sem. hrs.*

MTH 543. LINEAR MODELS: Least square techniques, lack of fit and pure error, correlation, matrix methods, F test, weighted least squares, examination of residuals, multiple regression, transformations and dummy variables, model building, ridge regression, stepwise regression, multiple regression applied to analysis of variance problems. Prerequisite: MTH 368 or equivalent. *3 sem. hrs.*

MTH 545. SPECIAL FUNCTIONS: The special functions arising from solutions of boundary value problems which are encountered in engineering and the physical sciences. Hypergeometric functions, Bessel functions, Legendre polynomials. Prerequisite: MTH 403 or equivalent. *3 sem. hrs.*

MTH 547. STATISTICS FOR EXPERIMENTERS: Covers those areas of design of experiments and analysis of quantitative data that are useful to anyone engaged in experimental work. Designed experiments using replication and blocking. Use of transformations. Applications of full and fractional factorial designs. Experimental design for developing quality into products using Taguchi methods. Prerequisite: MTH 367 or equivalent. *3 sem. hrs.*

MTH 551. METHODS OF MATHEMATICAL PHYSICS: Linear transformations and matrix theory, linear integral equations, calculus of variations, eigenvalue problems. Prerequisite: MTH 403 or equivalent. *3 sem. hrs.*

MTH 552. METHODS OF APPLIED MATHEMATICS: Dimensional analysis and scaling, regular and singular perturbation methods with boundary layer analysis, the stability and bifurcation of equilibrium solutions, other asymptotic methods. Prerequisites: MTH 403 or equivalent. *3 sem. hrs.*

MTH 555-556. NUMERICAL ANALYSIS: Quadrature methods, the numerical solution of ordinary and partial differential equations, matrices and large scale systems, modern iterative matrix methods, minimax approximation, orthogonal functions, and data smoothing. Prerequisites: CPS 144 or 150, MTH 302 or equivalent, and MTH 319. *3 sem. hrs. each.*

MTH 561. MODERN ALGEBRA I: Groups, rings, integral domains and fields; extensions of rings and fields; polynomial rings and factorization theory in integral domains; modules and ideals. *3 sem. hrs.*

MTH 562. MODERN ALGEBRA II: Finite and infinite field extensions, algebraic closure, constructible numbers and solvability by use of radicals, Galois theory, and selected advanced topics. Prerequisite: MTH 561. *3 sem. hrs.*

MTH 565. LINEAR ALGEBRA: Vector spaces, linear transformations and matrices; determinants, inner product spaces, invariant direct-sum decomposition and the Jordan canonical form. *3 sem. hrs.*

MTH 571. TOPOLOGY I: An axiomatic treatment of the concept of a topological space; bases and subbases; connectedness, compactness; continuity, homeomorphisms, separation axioms and countability axioms; convergence in topological spaces. *3 sem. hrs.*

MTH 572. TOPOLOGY II: Compactification theory, para-compactness and metrizability theorems, uniform spaces, function spaces, and other advanced topics of current interest. Prerequisite: MTH 571 or equivalent. *3 sem. hrs.*

MTH 573. FUNCTIONAL ANALYSIS: The study of linear metric spaces with emphasis on Banach and Hilbert spaces. The Hahn-Banach theorem, the Banach fixed point theorem, and their consequences. Approximations and other selected advanced topics. *3 sem. hrs.*

MTH 575. DIFFERENTIAL GEOMETRY: Vector and tensor algebra; covariant differentiation. An introduction to the classical theory of curves and surfaces treated by means of vector and tensor analysis. *3 sem. hrs.*

MTH 582. VECTOR AND TENSOR ANALYSIS: The differential and integral calculus of scalar and vector fields with emphasis on properties invariant under transformations to curvilinear coordinate systems. An introduction to tensor analysis via Cartesian tensors and then more general tensors. Derivation of the divergence, gradient, and curl in generalized coordinates. Prerequisites: MTH 218 and MTH 302 or equivalent. *3 sem. hrs.*

MTH 583. DISCRETE AND CONTINUOUS FOURIER ANALYSIS: Fourier representations of complex-valued functions, rules for finding Fourier transforms, mathematical operators associated with Fourier analysis, fast algorithms, selected applications. Prerequisites: MTH 302 or equivalent, and MTH 219 or 319 or equivalent. *3 sem. hrs.*

MTH 590. TOPICS IN MATHEMATICS: This course, given upon appropriate occasions, deals with specialized material not covered in the regular courses. May be taken more than once as topics change. Prerequisite: consent of advisor. *3 sem. hrs. each term.*

MTH 598. THESIS *3-6 sem. hrs.*

Department of **PHILOSOPHY (PHL)***

Patricia A. Johnson,
Chair of the Department

The graduate program in philosophy leading to the Master of Arts provides the conditions for cooperative study and research enabling a student to acquire a more comprehensive knowledge and understanding of major philosophical positions in both the history of philosophy and in contemporary philosophy and develop abilities for critical philosophical reflection.

Some of the students earning this degree have gone on to do doctoral work in philosophy and other academic areas. Some have gone on to teach philosophy at four-year and two-year colleges. Still others have pursued the program out of a general interest in advanced philosophical studies or in conjunction with further professional studies.

A distinctive feature of the graduate program in philosophy is the emphasis on the continuity of philosophic inquiry from the ancient and the medieval eras to the modern and contemporary periods. Each graduate student arranges a program in consultation with the chair of the Philosophy Department. A program of study developed in accordance with student objectives normally calls for exposure to areas beyond those of immediate interest to the student.

**At this time, students are not admitted into the program.*

ASSISTANTSHIPS

Graduate teaching assistantships are available for the first and second years of study. These offer tuition and fee remissions. Residence hall counselorships, which include stipends as well as tuition and fee remission are also available for qualified students.

Teaching Apprenticeship

All graduate teaching assistants participate in a two-year apprentice-

ship program. In the first year, students work closely with a faculty member in the teaching of the introductory course in philosophy and participate in monthly seminars on pedagogical problems and solutions encountered at this level. In the second year, students who successfully complete their first-year apprenticeship are eligible to teach the introductory course under supervision in both semesters. Teaching assistants sign up each semester for one hour credit in PHL 698 *Teaching Apprenticeship in Philosophy*. These credits do not reduce the 30 semester hours of course work required for the degree.

ADMISSION REQUIREMENTS

Students working toward the Master of Arts in Philosophy are subject to the general graduate policies and requirements of the University and the College of Arts and Sciences. In addition, the following departmental requirements hold: a formal statement of a student's objectives in taking the philosophy program is requested along with the application. For admission to regular status, a student must have had at least 24 semester hours in undergraduate philosophy courses or have equivalent competence. Otherwise, the student can apply for conditional or unclassified status.

PROGRAM REQUIREMENTS

Students pursuing the Master of Arts need a minimum of 30 semester hours of satisfactory graduate work. Six of these may be given for a satisfactory thesis (if the thesis option is chosen), or six may be given for satisfactory graduate or professional course work in non-philosophy subjects.

Readings Examination

Students pursuing the Master of Arts degree must show competency in understanding prime source material of major philosophers in the

history of philosophy. This is evidenced by passing an oral examination based on the reading list available through the department. Authors include Plato, Aristotle and Aquinas, or Anselm for the ancient and medieval period, and Descartes, Hume, and Kant for the modern period.

PROGRAM OPTIONS

Students working toward the Master of Arts with a major in philosophy have the following options available to them:

Thesis

Students may choose to write a research thesis in view of their personal and professional objectives. For further information consult the chair.

Language Examination

Students wishing to continue their philosophic studies are strongly urged to learn at least one or two foreign languages to improve their professional skills in philosophy. Language examinations may be arranged through the chair of the Philosophy Department. If they are passed, the results will be noted on the student's official records; but no graduate credit is awarded for passing a language examination. Satisfactory completion is shown by the grade CR (credit) on the transcript. These credits do not reduce the 30 semester hours of course work required for the degree.

JOINT M.A. IN PHILOSOPHY—J.D. IN LAW

The department also affords opportunities to qualified Law students to pursue the Master of Arts Degree in Philosophy jointly with the Juris Doctor at the University of Dayton Law School. For additional information, consult the chair of the Philosophy Department.

COURSES OF INSTRUCTION

The department regularly reviews its curriculum and cycles its courses to help meet the needs of its students and fulfill program objectives. The curriculum consists of courses using classic and contemporary primary texts in four areas to promote breadth at the master's degree level:

- Continuity of Western Philosophic Problems
- Diversity of Worldwide Philosophic Styles and Methods
- Persons and Knowledge
- Persons and Values

A Course Registration Guide is regularly published in advance of registration with notice on course objectives, context, texts, methods of instruction, and methods of evaluation for the course. Graduate classes normally meet in the late afternoon and early evening hours during the fall and winter semesters. In the summer semester, courses may be arranged through the chair.

CONTINUITY OF WESTERN PHILOSOPHIC PROBLEMS

PHL 601. PHILOSOPHY OF PLATO: A detailed analysis of some of Plato's major dialogues such as the *Meno*, *Theaetetus*, *Sophist*, *Parmenides*, and *Timaeus*. 3 sem. hrs.

PHL 602. PHILOSOPHY OF ARISTOTLE: A study of some of the major metaphysical, logical, epistemological, moral, and political issues discussed in Aristotle's texts. 3 sem. hrs.

PHL 603. MEDIEVAL STUDIES: A study of the writings of a particular medieval philosopher and/or a particular problem in medieval philosophy. 3 sem. hrs.

PHL 604. PHILOSOPHY OF AQUINAS: A study of the moral, social, political, legal, religious, epistemological, and metaphysical issues raised by St. Thomas in his own

writings, as developed in those of his commentators, and as they bear on problems in recent philosophy.
3 sem. hrs.

PHL 605. PHILOSOPHY OF DESCARTES: A critical examination of Descartes' philosophy in his major works in view of the characteristic claims of rationalism.
3 sem. hrs.

PHL 606. PHILOSOPHY OF HUME: A detailed examination of the epistemological, metaphysical, and ethical issues discussed in Hume's major texts and by contemporary commentators.
3 sem. hrs.

PHL 607. PHILOSOPHY OF KANT: An in-depth study of either Kant's theoretical philosophy such as the problem of metaphysics as found in the *Dissertation of 1770*, the *Critique of Pure Reason*, and the *Prolegomena to Any Future Metaphysics*, or his practical philosophy such as the problem of objective ethics as found in the *Critique of Practical Reason* and in the *Foundations of the Metaphysics of Morals*.
3 sem. hrs.

PHL 608. PHILOSOPHY OF HEGEL: A study of *The Phenomenology of Spirit* as an introduction to Hegel's overall philosophy with special attention to important passages such as the master-slave dialect which has influenced subsequent philosophical development.
3 sem. hrs.

DIVERSITY OF WORLDWIDE PHILOSOPHIC STYLES AND METHODS

PHL 621. AMERICAN PRAGMATISM: An examination of the major philosophic writings in the American Pragmatic tradition with stress on C. S. Peirce, William James, or John Dewey.
3 sem. hrs.

PHL 622. EXISTENTIALISM: A study of existentialism as an original view of the human person and the lived world by one major existential philosopher such as Sartre or Heidegger.
3 sem. hrs.

PHL 623. MARXIST PHILOSOPHY: An examination of the central concepts developed and analyzed by Karl Marx in his major works. Also studied are some contemporary developments of Marxist thought.
3 sem. hrs.

PHL 624. PHENOMENOLOGY: A study of the origins of phenomenology in the descriptive psychology of Brentano, its development to a form of transcendental idealism by Husserl, and the attempt of Husserl to establish philosophy as a rigorous science by a phenomenological method. The bearing of phenomenology on Heidegger's and Sartre's attempts to develop a phenomenological ontology will also be explored.
3 sem. hrs.

PHL 625. PHILOSOPHY OF LANGUAGE: An in-depth examination of such topics as meaning, naming, referring, and truth with emphasis on contemporary theories and problems in the Anglo-American tradition.
3 sem. hrs.

PHL 626. ORIENTAL PHILOSOPHY: A critical examination of Hindu and Buddhist philosophies with concentration on the ultimate reality, consciousness, and salvation.
3 sem. hrs.

PHL 627. PROCESS PHILOSOPHY: A critical study of Alfred North Whitehead's *Process and Reality* in view of its historical setting, his other works, and the works of such process philosophers as Bergson and Hartshorne.
3 sem. hrs.

PHL 628. RECENT JUDAIC AND CHRISTIAN PHILOSOPHY: An examination of current approaches and solutions to the perennial problems of Judaic and Christian philosophy by such thinkers as Alston, Dupre, Grisez, Mavrodes, McInerney, Noonan, Plantinga, Smart, Weiss and others. Topics include the relation of religious belief to reason; the significance of suffering and of death; moral belief and natural law; immortality and resurrection.
3 sem. hrs.

PERSONS AND KNOWLEDGE

PHL 641. ADVANCED LOGIC: A study of both formalization and interpretation of such concepts as necessity, entailment, consistency, completeness, negation and a wide range of propositional attitudes.
3 sem. hrs.

PHL 642. EPISTEMOLOGY: An examination of recent developments in the theory of knowledge in Anglo-American philosophy, with emphasis on alternative theories of cognitive justification, skepticism, and the "justified true belief analysis" of knowledge.
3 sem. hrs.

PHL 643. METAPHYSICS: A detailed analysis of some central metaphysical concepts such as identity and personal identity, causality and necessity, freedom and determinism. Topics can vary but will include an examination of the concept of metaphysics itself.
3 sem. hrs.

PHL 644. PHILOSOPHY OF SCIENCE: An examination of selected methodological issues in either the physical or social sciences, with emphasis on the following: explanation, confirmation, theory and concept formation, observation and the problem of objectivity.
3 sem. hrs.

PERSONS AND VALUES

PHL 651. PHILOSOPHY OF THE PERSON: An investigation into the nature of human beings as described in those contemporary models that do not exclusively concentrate on the cognitive abilities or features of the human being. Such issues as freedom, motivation, action, consciousness, intentionality, and interpersonal relations will be examined philosophically.
3 sem. hrs.

PHL 652. ETHICS: A critical review and evaluation of ethical and metaethical theories since G. E. Moore.
3 sem. hrs.

PHL 653. AESTHETICS: A critical examination of important concepts as well as problems and theories in the philosophy of art.
3 sem. hrs.

PHL 654. PHILOSOPHY OF RELIGION:

A study of the nature of religion and a critical evaluation of the issues related to religious language and the concept and existence of God.

3 sem. hrs.

PHL 655. SOCIAL AND POLITICAL PHILOSOPHY:

A critical philosophic examination of major social and political philosophies as well as the central concepts in social and political philosophy.

3 sem. hrs.

PHL 656. PHILOSOPHY OF LAW:

A study of legal norms and values in legal reasoning with clarification of core concepts of a legal system such as responsibility, defenses, fault, and equity and of the major styles of legal theory such as natural law and positive law. Different patterns of legal decision-making, e.g., criminal, civil, and constitutional will be stressed.

3 sem. hrs.

PHL 657. MORALITY, SOCIAL ETHICS, AND LAW:

A philosophic study of certain important moral, social, and religious values such as equality, order, liberty, life, property, rights, justice, respect, and charity especially in the context of legislative, judicial, and interinstitutional decision-making.

3 sem. hrs.

PHL 658. ETHICS IN CLINICAL ASSESSMENT AND PSYCHOTHERAPY:

An examination of the conceptual structures, the derivation of ethical principles and their application in the general framework of client assessment and the practice of psychotherapy. Discussion includes evaluating ethical codes, assessment practices, the techniques of psychotherapy and significant problems arising in clinical practice.

3 sem. hrs.

PHL 659. ETHICAL THEORIES AND NUCLEAR WARFARE:

A contrast of realism, contractarianism, utilitarianism, Marxism, just-war doctrine, and pacifism as applied to nuclear war, limited nuclear war, deterrence, feasible alternatives, and related issues.

3 sem. hrs.

SPECIAL COURSES

PHL 690. SEMINAR: Topics, authors, and/or problems in philosophy selected by the professor. 3 sem. hrs.

PHL 695. DIRECTED STUDIES: To augment the graduate student's previous training or to allow advanced study on a particular problem, philosopher, or historical era. Arrange through the chair. 3 sem. hrs.

PHL 698. TEACHING APPRENTICESHIP IN PHILOSOPHY:

Participation each term as a teaching apprentice to faculty and in the direct teaching of lower-level undergraduate philosophy courses. Required of and open only to graduate philosophy assistants. 1 sem. hr.

PHL 699. THESIS 3-6 sem. hrs.

Department of PHYSICS (PHY)

J. Michael O'Hare,
Chair of the Department

The Physics Department, as part of the Center for Electro-Optics, offers graduate courses in support of the Master of Science, and Doctor of Philosophy in Engineering in Electro-Optics. For more details on the program requirements, see Electro-Optics (EOP) in Chapter X, School of Engineering.

ASSISTANTSHIPS

A limited number of graduate assistantships are available for graduate students in the Electro-Optics Program. These generally carry a stipend and tuition remission for the courses required for the degree. Recipients are expected to complete the requirements for the Master's degree in two years. Detailed information and forms for making application may be obtained from the Chair of Physics or the Director of Electro-Optics.

COURSES OF INSTRUCTION

PHY 510/EOP 513. LINEAR SYSTEMS THEORY IN OPTICS:

Wave theory; electromagnetic theory; mathematical techniques; Fresnel and Fraunhofer diffraction; coherence; and interference.

3 sem. hrs.

PHY 520. SOLID STATE PHYSICS:

Crystal structure, thermal properties of solids; insulators; band theory of solids; semi-conductors; luminescence.

3 sem. hrs.

PHY 525. QUANTUM MECHANICS I:

The physical basis of quantum mechanics, wave packets, free particle motion; Schrodinger's equation applied to potential problems; harmonic oscillator and the hydrogen atom; three-dimensional extrapolation and scattering.

3 sem. hrs.

PHY 599/EOP 501 GEOMETRIC OPTICS:

Wavefronts and rays; Fermat's principle; Gaussian optics and axially symmetric systems; aperture stops; pupils and fields lenses; Lagrange invariant; angular and visual magnification; optical systems; plane mirrors and prisms; aberration theory; introduction to computer ray tracing.

3 sem. hrs.

PHY 599/EOP502. OPTICAL RADIATION AND MATTER:

Maxwell's equations; electromagnetic waves; interaction of radiation with atomic electrons; molecular and lattice vibration; study of phenomena related to the interaction of optical radiation with matter; polarization; crystal optics; nonlinear dielectric effects.

3 sem. hrs.

Department of
**POLITICAL
SCIENCE (POL)**

David W. Ahern,
Chair of the Department
A.E. Lapitan, Director,
MAIA Program
Richard K. Ghere,
Director, MPA Program

The Department of Political Science offers two graduate programs, each designed to accomplish a particular objective.

- **Master of Arts in Political Science (concentration in International Affairs)** This program affords mid-career professionals and other interested individuals an opportunity to enhance their ability to analyze and interpret contemporary issues in international affairs. The program combines theoretical, regional, and functional approaches to the study of world affairs. Students are encouraged to draw insights from the fields of international and comparative politics and from such related disciplines as history, economics, law, and business.

- **Master of Public Administration** is a professional degree designed to prepare students for administrative careers in contemporary society.

ASSISTANTSHIPS

The department offers two graduate assistantships each year. The graduate assistants perform research and administrative tasks for the faculty. Each assistant receives full tuition remission plus stipend. An assistantship once granted is renewable for a second year.

**MASTER OF ARTS—
CONCENTRATION
IN INTERNATIONAL AFFAIRS**

**ADMISSION
REQUIREMENTS**

1. Baccalaureate degree from an accredited college or university.
2. Undergraduate concentration in one of the fields of the social sciences. Candidates without this qualification may still be admitted on a *conditional* basis.
3. Cumulative grade point average of 2.7 or better in a 4.0 grading system, or a combined score of a least 1000 on the verbal and quantitative sections of the Graduate Record Examination. Those candidates with lower cumulative averages or GRE scores may be considered for acceptance on a *conditional* basis. In such cases particular attention will be given to the information contained in the applicant's statement on career objectives and the letters of recommendation.
4. Candidates who have earned their degrees in a pass-fail grading system must submit their scores in the verbal and quantitative sections of the GRE.

DEGREE REQUIREMENTS

- I. To receive the Master of Arts degree with a concentration in International Affairs, the student must satisfactorily complete thirty-six hours of course work with a cumulative grade point average of 3.0 or better.
 - A. The thirty-six hours of course work must include POL 503 (Colloquium in Comparative Politics), POL 515 (International Relations), POL 590 (Research Seminar), and POL 500 (Politics of International Economic Relations).
 - B. The remainder of the thirty-six hours must consist of courses selected from the M.A.I.A. curriculum which emphasizes

the areas of International Relations/Foreign Policy and Comparative Politics/Modernization. No more than six *semester hours* of courses may be taken outside of the M.A.I.A. curriculum and these courses must be approved by the department. Students can take up to *six hours* of courses at the 400-level but such courses must be approved by the department.

- II. At the completion of 12 semester hours of credit, the academic progress of the student will be evaluated by a committee of departmental faculty. It is *incumbent* upon the student after the completion of 12 semester hours of credit to *initiate* the petition for review with the chair of the M.A.I.A. Committee.

CURRICULUM

General courses:

- POL 567 Independent Study
- POL 590 Research Seminar
- POL 591 Special Seminar

International Relations/Foreign Policy courses:

- POL 500 Politics of International Economic Relations
- POL 509 Soviet Foreign Policy
- POL 515 International Relations
- POL 516 Comparative Foreign Policy Analysis
- POL 517 American Foreign Policy
- POL 518 U.S. National Security Policy
- POL 519 Chinese Foreign Policy
- POL 524 U.S.-Latin-American Relations
- POL 406 International Law and Organization

Comparative Politics/Modernization courses:

- POL 503 Colloquium in Comparative Politics
- POL 520 Soviet Politics
- POL 523 Latin American Politics
- POL 525 Politics in the Middle East
- POL 528 Theory & Practice of Communism

- POL 529 Seminar in European Politics
 POL 530 Seminar: Chinese Politics
 POL 531 Seminar: Japanese Politics
 POL 583 Comparative Public Policy
 POL 457 Political Change in the Third World

MASTER OF PUBLIC ADMINISTRATION

ADMISSION REQUIREMENTS

1. Baccalaureate degree from an accredited college or university.
2. Cumulative grade point average of 2.7 in a 4.0 grading system, or a combined score of at least 1000 on the verbal and quantitative sections of the Graduate Record Examination. Those with lower averages and GRE scores may be considered for acceptance on a conditional basis subject to stipulations determined by the Program Director. In such cases particular attention will be given to the information requested in admissions requirements 4 and 5.
3. Students applying from schools operating on a pass-fail grading system are required to submit scores from the verbal and quantitative sections of the GRE. Other applicants are encouraged to submit GRE scores as additional evidence of their competence to do graduate work.
4. The following will also be considered:
 - (a) At least three letters of recommendation from individuals in a position to judge the applicant's capacity for graduate work. Persons who have graduated from college within the past five years must submit at least one letter from a former professor. These letters are considered to the extent they show evidence of the applicant's ability to perform graduate work.
 - (b) The applicant's work experience and statement of career

objectives as related to public administration.

- (c) The applicant's undergraduate academic preparation and achievements in disciplines related to the public service.
5. An applicant may be required to submit additional information when the MPA committee feels that such information is necessary.

DEGREE REQUIREMENTS

- I. To receive the Master of Public Administration degree, the student must satisfactorily complete 36 semester hours of course work with a cumulative grade point average of 3.0 or better.
 - A. The 36 hours of course work must include MPA 500, MPA 510, MPA 520, MPA 530, and MPA 540. The required courses may be waived for students with appropriate academic backgrounds.
 - B. The remainder of the 36 hours must consist of courses selected from the M.P.A. curriculum. Exceptions may be made, on the determination of the program director, if the student's career objectives make public management-related courses in other graduate programs particularly useful. No more than six semester hours outside the M.P.A. curriculum may be taken.
- II. Within the general requirements in A and B above, the student may select one of three options:
 - A. The student may take 30 to 33 semester hours of academic course work and 3 to 6 hours of MPA 595, Government Internship. A student taking this option is encouraged to begin the internship only after completing 18 semester hours of other courses and successfully passing the Certifying Examination.
 - B. The student, under certain conditions, may take 30 to 33

hours of academic course work and 3 to 6 hours of MPA 597, Public Service Project. This option is available only to students employed in Administrative positions other than internships in public or nonprofit agencies. Students should enroll in MPA 597 only after completing 18 hours of other courses and successfully passing the Certifying Examination.

- C. The student must take the full 36 semester hours in regular academic courses.

- III. Students are required to take a written Certifying Examination in the semester of their eighteenth hour of M.P.A. course work (excluding credit from other schools or programs). Students are responsible for having completed the five required courses (MPA 500, MPA 510, MPA 520, MPA 530 and MPA 540) by the end of that semester. Application to take the examination must be submitted to the Program Director no later than the sixth full week of that semester.

The Certifying Examination will evaluate the student's mastery of core concepts and ability to analyze problems consistent with the scope of the required courses.

Certifying Examinations will be graded by a committee of faculty members who teach M.P.A. courses. This committee will take one of three actions:

- A. Certify the student for further course work without restriction.
- B. Certify the student for further course work with restrictions.
- C. Require that the student be re-examined. No more than one re-examination per student may be given. Failure to pass the re-examination will result in removal from the program.

CURRICULUM

General Administration and Management

- MPA 500 Public Administration
- MPA 502 Intergovernmental Relations
- MPA 504 State and Local Government
- MPA 506 Urban Administration
- MPA 508 Contemporary Issues in Public Management

Analytic Tools

- MPA 510 Quantitative Methods
- MPA 512 Computer Applications for Public Administration
- MPA 514 Government Planning

Group and Organization Dynamics

- MPA 520 Organization Theory
- CMM 517 Organizational Communications
- CMM 537 Conflict Resolution through Communication

Fiscal Management

- MPA 530 Fiscal Administration
- MPA 532 Governmental Fund Management and Reporting

Human Resources

- MPA 540 Public Sector Human Resource Management
- MPA 542 Public Sector Labor Management Relations

Policy Studies

- MPA 551 Introduction to Public Policy
- MPA 553 Urban Politics and Policy
- MPA 555 Selected Topics in Public Policy

The Nonprofit Sector

- MPA 561 Introduction to Nonprofit Organizations

Public Law/Bureaucracy

- MPA 571 Administrative Law
- MPA 573 The Politics of Bureaucracy and Regulation

Topical Seminars/Independent Work

- MPA 591 Seminar in Public Administration

- MPA 593 Independent Study in Public Administration
- MPA 595 Government Internship
- MPA 597 Public Service Project

COURSES OF INSTRUCTION (M.A.I.A. Program)

Graduate students in Political Science and Public Administration may take no more than two 400-level courses for graduate credit, with the permission of the chair of the appropriate graduate committee. Undergraduate courses specified as a condition for admittance to the graduate program do not count as graduate credit.

POL 500. POLITICS OF INTERNATIONAL ECONOMIC RELATIONS: A structural—analytical study of the political dimension of the international economic system. Focus upon the Western system of interdependence, the North-South system of dependence, and the East-West system of independence. *3 sem. hrs.*

POL 501. SCOPE AND METHODS OF POLITICAL SCIENCE: Analysis of theoretical approaches to the study of politics and the techniques and methodologies currently employed in political science research. *3 sem. hrs.*

POL 503. COLLOQUIUM IN COMPARATIVE POLITICS: An examination of various theoretical and empirical approaches in the study of comparative politics and political development with special emphasis on cross-national comparison and the use of aggregate data in comparative analysis. *3 sem. hrs.*

POL 509. SOVIET FOREIGN POLICY: This course is designed to provide the student with a broad introduction to Soviet views on East-West relations. The course will deal with cooperative and competitive aspects of those relations in three areas—political, economic, and military, and the problem and opportunities they present for Soviet foreign security and policy. *3 sem. hrs.*

POL 515. INTERNATIONAL RELATIONS: Analysis of selected theories and approaches in the study of international relations, with particular emphasis on the nature of power and the sources of transformation in the contemporary international system. *3 sem. hrs.*

POL 516. COMPARATIVE FOREIGN POLICY ANALYSIS: Systematic analysis of the external factors shaping the foreign policies of selected states and of current models of foreign policy decision-making. Special emphasis will be placed on comparison of Soviet and American policy. *3 sem. hrs.*

POL 517. AMERICAN FOREIGN POLICY: Study and analysis of the factors, both internal and external, which have shaped American foreign policy in the post World War II period, the major instruments of policy and their effectiveness, and the impact of changes since 1970. *3 sem. hrs.*

POL 518. UNITED STATES NATIONAL SECURITY POLICY: Analysis of United States global security policies and defense strategies with attention to continuities and changes in doctrines, commitments, perceptions of the Soviet threat, and the impact of technology. *3 sem. hrs.*

POL 519. CHINESE FOREIGN POLICY: Analysis of the Chinese foreign policy structures and processes as well as the development of Chinese foreign policy and relations with the Soviet Union, the United States, and the Third World. *3 sem. hrs.*

POL 520. SOVIET POLITICS: The nature of the Soviet state, its economic system, the role of the Communist party and the influence of Marxist-Leninist ideology will be examined along with contemporary problems and political dynamics. *3 sem. hrs.*

POL 523. LATIN AMERICAN POLITICS: Systematic analysis of the political, economic, and social structures and forces shaping politics in selected Latin American countries. *3 sem. hrs.*

POL 524. U.S.-LATIN AMERICAN RELATIONS: Examines the evolving relations between the United States and the other member-states of the Inter-American system, and introduces students to a wide variety of theoretical perspectives on Inter-American relations. Special attention is focused on the issues that dominate the agenda of Inter-American relations. *3 sem. hrs.*

POL 525. POLITICS IN THE MIDDLE EAST: Analysis of major political and social forces, such as religion and nationalism, that shape the contemporary Middle Eastern states. *3 sem. hrs.*

POL 528. THEORY AND PRACTICE OF COMMUNISM: An analysis of the content and development of Communist theory and practice with primary emphasis on the Soviet Union, China, and Yugoslavia. Select coverage will also be given to the experiences of Cuba and Romania. *3 sem. hrs.*

POL 529. SEMINAR IN EUROPEAN POLITICS: Systematic analysis of the political structures and processes of two or more countries in Western Europe and two or more in the Soviet Union and Eastern Europe, with emphasis on selected contemporary political, economic, and social problems. May be repeated once when focus changes. *3 sem. hrs.*

POL 530. SEMINAR: CHINESE POLITICS: Analysis of the political process and policy-making in China with emphasis upon elite interaction concerning leadership succession and economic development strategies. *3 sem. hrs.*

POL 531. SEMINAR: JAPANESE POLITICS: Analysis of the political process, policy-making, and select public policies in Japan with emphasis upon the dynamics of one-party democracy and factionalism in Japanese politics. *3 sem. hrs.*

POL 567. INDEPENDENT STUDY IN POLITICAL SCIENCE: Reading and research on special topics in

political science under the direction of a faculty member. Research paper. May be repeated once when topic changes. *3 sem. hrs.*

POL 583. COMPARATIVE PUBLIC POLICY: Study of the applicability and limitations of current approaches in public policy analysis for cross-national and/or cross-cultural comparison. Emphasis on the analysis of how such public policy issues as defense, welfare, education, and economic development are determined by select political systems in the developed and developing world. *3 sem. hrs.*

POL 590. RESEARCH SEMINAR IN POLITICAL SCIENCE: Directed research on a selected topic in American or comparative politics which requires the application of a specific approach, generation and analysis of data which result in a major research paper. *3 sem. hrs.*

POL 591. SPECIAL SEMINAR: An in-depth investigation and analysis of a specific area in comparative politics or international relations. May be repeated once when area of analysis changes. *3 sem. hrs.*

POL 597. RESEARCH PROJECT: Required of all M.A. students. Completion of the research paper begun in POL 590; evaluation of the substance, methodology, and findings of the paper by the professor; and presentation of the paper to students and faculty of the Political Science department. *3 sem. hrs.*

COURSES OF INSTRUCTION (MPA Program)

MPA 500. PUBLIC ADMINISTRATION: Study of administrative organization, systems, processes and methods as applied to government programs and operations, with a comparison of structural and behavioral approaches. *3 sem. hrs.*

MPA 502. INTERGOVERNMENTAL RELATIONS: Study of the interaction processes of various levels

of government in the United States, including problems of federalism, interstate cooperation, and federal-urban relations. *3 sem. hrs.*

MPA 504. STATE AND LOCAL GOVERNMENT: An in-depth examination of particular state-local institutional relationships with emphasis upon current issues. *3 sem. hrs.*

MPA 506. URBAN ADMINISTRATION: Study of the structures, processes, programs, policies and problems of administrative agencies of local government, with particular emphasis on metropolitan areas. *3 sem. hrs.*

MPA 508. CONTEMPORARY ISSUES IN PUBLIC MANAGEMENT: An in-depth examination of a current management issue supported by recent literature in public administration and relevant to surrounding local governments. Analysis of root causes of the problem issue. Exploration of management approaches available to local governments. May be repeated once when course focus changes. *3 sem. hrs.*

MPA 510. QUANTITATIVE METHODS IN PUBLIC ADMINISTRATION. Introduction to research techniques involving quantitative methods and analysis applicable to the formation and implementation of public programs. Emphasis on basic statistics and research methodology. Aimed at understanding appropriate application and interpretation of quantitative methods rather than competence in practical or scholarly use. *3 sem. hrs.*

MPA 512. COMPUTER APPLICATIONS FOR PUBLIC ADMINISTRATION: Microcomputer applications in the practice of public administration and policy research. Course strongly oriented toward problem-solving. *3 sem. hrs.*

MPA 514. GOVERNMENT PLANNING: Consideration of the planning function in the administrative process

and the role of planning agencies in decision making and problem solving. Evaluation of trends and changing characteristics of planning in the United States. *3 sem. hrs.*

MPA 520. ORGANIZATION THEORY: Survey of current literature and research on the theory of complex organizations. Rationality in decision making; problems of authority; behavioral, political, and technical influences on organization. *3 sem. hrs.*

MPA 530. FISCAL ADMINISTRATION: Study of governmental expenditures and revenues, budgetary and financial reporting, fiscal policy, and other areas of fiscal management, with emphasis on current practices and problems. *3 sem. hrs.*

MPA 532. GOVERNMENTAL FUND MANAGEMENT AND REPORTING: Examination of the fund structures within local/state governments and selected nonprofit entities. Emphasis upon understanding the managerial implications of financial statements and reports. *3 sem. hrs.*

MPA 540. PUBLIC SECTOR HUMAN RESOURCE MANAGEMENT: A broad-based study of people management ranging from the development and integration of organizational policy, through the many personnel administrative processes, and the human and regulatory aspects affecting the contemporary public sector workforce. *3 sem. hrs.*

MPA 542. PUBLIC SECTOR LABOR MANAGEMENT RELATIONS: This course is designed to focus on the labor relations function as it is found in the public sector. Topics to be covered include the rise of government employee labor unions, collective bargaining and policy impacts of public employee unions. *3 sem. hrs.*

MPA 551. INTRODUCTION TO PUBLIC POLICY: This course is designed to introduce students to the

study of public policy and public policymaking. The central concerns of the course involve competing models of the policy process, the policymaking process in the United States, the interplay between the political and economic systems in policymaking, and the processes of policy analysis and evaluation. *3 sem. hrs.*

MPA 553. URBAN POLITICS AND POLICY: A study of the political processes and governmental structures in urban areas with emphasis on the relations among governmental units, community power structures, and the formulation and execution of public policy. *3 sem. hrs.*

MPA 555. SELECTED TOPICS IN PUBLIC POLICY. Policy process, policy outcomes, and policy impact in an area or areas of public policy varying among such topics as transportation, education, welfare, national defense, science, civil rights, and urban and community development. May be repeated when topic changes. *3 sem. hrs.*

MPA 561. INTRODUCTION TO NONPROFIT ORGANIZATIONS: This course surveys the generalized body of knowledge common to all nonprofit organizations, distinguishing them from governmental and for-profit entities. Emphasis placed upon an overall understanding of the nonprofit sector and its emerging role in society. *3 sem. hrs.*

MPA 571. ADMINISTRATIVE LAW: Study of the judicial function and activities of federal agencies; formal and informal processes in administrative hearings; basic principles of administrative law; judicial interpretation; the question of increased judicialization of the administrative process. *3 sem. hrs.*

MPA 573. THE POLITICS OF BUREAUCRACY AND REGULATION: Examination of the nature and meaning of bureaucracy in contemporary American society and the devices for its evaluation and control.

This course may be jointly offered with POL 413. In such cases, the graduate requirement will be distinct from undergraduate requirements. *3 sem. hrs.*

MPA 591. SEMINAR IN PUBLIC ADMINISTRATION: Seminar on selected problems in public administration. May be repeated when topic changes. *3 sem. hrs.*

MPA 593. INDEPENDENT STUDY IN PUBLIC ADMINISTRATION: Intensive independent research under the direction of a faculty member. Research paper. May be repeated when topic changes. *3 sem. hrs.*

MPA 595. GOVERNMENT INTERNSHIP: Assignment to appropriate government agencies or units for the purpose of gaining wide experience with the administrative system through a program of work experiences. Internship includes a related academic requirement. *3 sem. hrs.*

MPA 597. PUBLIC SERVICE PROJECT: For students currently employed in administrative positions in public or nonprofit agencies. Completion of a written project relating theories and information from the field of public administration to the student's work experience and career objectives. *3 sem. hrs.*

Department of
PSYCHOLOGY (PSY)

F. Thomas Eggemeier,
Chair of the Department
David W. Biers, Director of Human
Factors and Research
John R. Korte,
Director of Clinical Program
Charles E. Kimble,
Coordinator of General Program

The Department of Psychology offers three Graduate Programs leading to the Master of Arts:

- Clinical Psychology
- Experimental-Human Factors Psychology
- General Psychology

In all programs emphasis is on integrating theory and research with appropriate applied experience and on competence in the development of relevant and original research. This is the product of individual supervision and a low student-to-faculty ratio. The aim of the department is to prepare the student for further graduate work at the Ph.D. level and/or for functioning at the M.A. level of specialization in an applied/community setting or through teaching and research.

To further specific research interests graduate students are encouraged to work with faculty members on a one-to-one basis. Academic advisors and the chair of the department will direct students to faculty members who share their specific interests and areas of specialization.

Graduate teaching and research assistantships are available on a competitive basis and include a stipend as well as tuition and fee remission. The Department of Psychology also offers a limited number of traineeships to students in the Clinical Psychology program. The traineeship placements are at local mental health agencies and vary in number and stipend from year to year depending upon the budgets and needs of the agencies participating in the traineeship program.

ADMISSION REQUIREMENTS AND PROCEDURE

Under normal circumstances an undergraduate grade point average of 3.0 or better (based on a 4.0 system) is required for admission to the graduate program. In addition, a minimum of 3.0 average in undergraduate course work in psychology is required.

It is expected that the applicant will have completed the requirement of a four-year undergraduate college, usually in liberal arts or science, including a minimum of 15 semester hours in psychology. These psychology

courses must include a course in introductory statistics, a course in experimental psychology or research design or the equivalent, and six semester hours in upper-level psychology courses. For students in Clinical Psychology, the upper-level courses should include Abnormal Psychology and Theories of Personality.

As a result of accreditation by the Human Factors and Ergonomics Society, applicants to the Experimental-Human Factors Program are required to have satisfactorily completed an undergraduate course in calculus and one in a structured computer programming language (either structured BASIC, FORTRAN, Pascal, or C). Students who have acquired knowledge of a computer programming language on their own may substitute demonstration of that knowledge for formal course work. Applicants deficient in either or both of these requirements may be admitted to the program with the stipulation that they make up any deficiency prior to the beginning of their second year. However, students admitted with deficiencies in either calculus or computer programming are strongly urged to satisfy these requirements prior to matriculating to the University of Dayton.

Students without psychology preparation may be admitted to the Experimental-Human Factors Psychology program on a conditional basis. Regular admission will follow contingent upon the completion of undergraduate work specified by the admissions committee. Students are urged to contact the Director of Human Factors and Research if they are considering this option.

Acceptance within a specific program is competitive, based upon the strength of the student's application and the number of positions available.

APPLICATIONS

Application forms may be obtained from the Office for Graduate Applications & Records at the University of Dayton to which all correspondence concerning the completion of the

application should be directed. For the Fall term the application deadline is March 15th. Applications after this deadline will be accepted but will not be reviewed in the original screening of applicants. For information about application for the Spring and Summer terms contact the chair of the Department of Psychology.

Inquiries concerning the master's program, its curriculum, and the Department of Psychology should be directed to the Chair, Department of Psychology, University of Dayton, Dayton, Ohio 45469-1430. It is the applicant's responsibility to supply the following information necessary for a completed application:

- A. The completed application form.
- B. Official transcripts of all undergraduate schooling (and graduate schooling where appropriate).
- C. At least three letters of recommendation (at least two of these should be from professors familiar with the student's academic work).
- D. Scores on the Graduate Record Examination (both general and Psychology scores are required).
- E. The Miller's Analogies Test score (MAT) is optional.
- F. A summary of undergraduate grade point averages.

Under unusual circumstances the chair of the Department of Psychology may waive one or more of the application requirements.

STUDENT STATUS

Each student admitted to the graduate program is placed in one of the following categories:

1. Regular standing: students meeting the entrance requirements of the department.
2. Conditional standing: students considered probationary pending the successful completion of 9 to 15 semester hours of graduate work or other requirements as determined by the department.
3. Unclassified standing: students enrolled in graduate courses of the department who are not

working toward a degree. Normally a student is permitted to enroll for a limited number of semester hours of credit under this status. Permission of either the chair or program director is required.

PROGRAM REQUIREMENTS

All students enrolled in any of the three programs leading to the Master of Arts with a major in Psychology are subject to the following general requirements of the Department of Psychology. Full time students normally complete program requirements in two years:

1. The number of semester hours and required courses as specified by the individual programs described below.
2. Demonstration of satisfactory progress toward the degree which includes the requirement that students maintain a minimum average of B (3.00) in course work. Students who fail to meet this requirement are either placed on academic probation or dismissed from the program.
3. Students are permitted no more than six semester hours with grades of C or lower. Students who fail to meet this requirement are dismissed from the program.
4. No more than six semester hours of 400-level courses may apply toward the master's degree, and normally no more than six semester hours of graduate work approved by the chair of the department may be transferred from other institutions.
5. Attendance is required at regularly scheduled extra-course seminars on selected issues in psychology and at occasional specialized programs.
6. Thesis must deal with an approved research problem, incorporating an appropriate review of theory and literature, and demonstrating competence in the application of research methodology.
7. Students are expected to conduct themselves in a professional and

ethical manner in accordance with generally accepted standards for psychologists. Failure to do so may result in dismissal.

8. It is the student's responsibility to know and to meet the requirements of the University and of the graduate program.

CLINICAL PSYCHOLOGY

In addition to a broad academic background and competence in the application of research methodology, the Clinical Psychology program provides the student with:

- (a) Thorough exposure to the areas of personality, psychopathology, and psycho-therapy,
- (b) Intensive training in the assessment of intelligence and personality,
- (c) Supervised practice in interviewing and therapeutic intervention, and
- (d) The opportunity to emphasize work with either children or adults.

Through practicum experience in various community and clinical settings affiliated with the University, the student can translate classroom learning into practical experience. The program is designed to prepare the student for competence at the Master's-level or for pursuing a doctoral degree in Clinical Psychology.

The Master of Arts with a major in Psychology (Clinical) requires 46 semester hours consisting of 42 hours of academic course work, including thesis, and 4 hours of practicum as specified below.

	Semester Hours
<i>Core Requirements:</i>	12
PSY 501 Experimental Design and Statistics I	3
PSY 502 Experimental Design and Statistics II	3
PSY 510 Proseminar	3
PSY 599 Thesis	3

Clinical Requirements:

Child Emphasis	25
PSY 550 Introduction to Clinical Psychology	3

PSY 551 Assessment of Intelligence	3
PSY 553 Theories and Research in Psychopathology	3
PSY 555 Theories of Personality and Psychotherapy	3
PSY 556 Personality Assessment ..	3
PSY 560 Childhood Psychopathology and Psychotherapy ..	3
PSY 569 Practicum	4
PSY 573 Developmental Psychology	3

Adult Emphasis

PSY 550 Introduction to Clinical Psychology	3
PSY 551 Assessment of Intelligence	3
PSY 553 Theories and Research in Psychopathology	3
PSY 555 Theories of Personality and Psychotherapy	3
PSY 556 Personality Assessment ..	3
PSY 564 Individual Psychotherapy	3
PSY 569 Practicum	4

Clinical Electives:

Child Emphasis

At least one of the following:	
PSY 563 Cognitive-Behavior Therapy	3
PSY 564 Individual Psychotherapy	3
PSY 566 Marriage and Family Therapy	3
At least three semester hours of:	
PSY 567 Special Topics in Clinical Psychology (1 cr. each) ..	3
Free Elective:	3

Adult Emphasis

At least two of the following:	
PSY 558 Group Psychotherapy	3
PSY 563 Cognitive-Behavior Therapy	3
PSY 565 Ethics in Assessment and Therapy	3
PSY 566 Marriage and Family Therapy	3

At least three semester hours of:

PSY 567 Special Topics in Clinical Psychology (1 cr. each) ..	3
Free Elective	3

Total Semester Hours	46
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EXPERIMENTAL-HUMAN FACTORS PSYCHOLOGY

The Master's program in Experimental-Human Factors Psychology is designed for the student who wishes to integrate the theory, methods, and data of experimental psychology with that of human factors. The program is accredited by the Human Factors and Ergonomics Society. The overall program is structured to prepare the student for further graduate study in experimental psychology or human factors at the Ph.D. level, and/or for a career as a research applied scientist in human factors psychology. The curriculum stresses integration of knowledge in three key areas: (1) the theoretical issues and quantitative research methodology associated with perception, human information processing, motor skills, and other psychological processes; (2) the application of the knowledge about basic psychological processes to the development of equipment, equipment interfaces, and work environments; and (3) the tools which the human factors specialist applies to system analysis, design, test, and evaluation. Emphasis is on the integration of course work with research and practical experience.

The Master of Arts with a major in Psychology (Experimental-Human Factors) requires 39 semester hours, including thesis, as specified below.

	Semester Hours
<i>Core Requirements</i>	12
PSY 510 Proseminar	3
PSY 501 Experimental Design & Statistics I	3
PSY 502 Experimental Design & Statistics II	3
PSY 599 Thesis	3
<i>Experimental-Human Factors Core Requirements</i>	18
PSY 533 Engineering Psychology	3
PSY 531 Human Factors in Systems Development	3
PSY 529 Perception	3
PSY 524 Human Information Processing	3
PSY 535 Ergonomics	3
PSY 535 Practicum in Human Factors	3
<i>Electives</i>	9

Courses may be selected from the following list or, with permission of the program director, from other graduate courses within the department, and from graduate courses outside the department in such related disciplines as engineering or computer science. No more than six hours of courses taken outside the department may count toward program credit.

PSY 506 Selected Topics in Advanced Research Methodology	3
<i>(May be taken more than once for credit)</i>	
PSY 534 Human Computer Interaction	3
PSY 522 Advanced Cognitive	3
PSY 528 Psychophysiology	3
PSY 532 Special Topics in Human Factors	3
<i>(May be taken more than once for credit)</i>	
PSY 536 Training System Development	3
PSY 537 Team and Group Processes	3
PSY 596 Experimental Research	1-3
PSY 597 Readings ..	1-3
Total Semester Hours	39

GENERAL PSYCHOLOGY

The Master of Arts in General Psychology offers students a broad background in some of the basic areas of psychology. The program is designed to prepare students for doctoral work by providing training through research and basic courses. A student would take a concentration in Cognitive Psychology, Developmental Psychology, and Social Psychology. Selected courses, but not a multi-course concentration, in Human Factors and/or Clinical Psychology are also available to the General Psychology student. With the six elective hours, it is also possible to develop interdisciplinary interests in computer science, education, business, engineering, communication, or biology.

The Master of Arts with a major in Psychology (General) requires 36 semester hours, including thesis, as specified below.

<i>Core Requirements</i>	12
PSY 501 Experimental Design and Statistics I	3

PSY 502 Experimental Design and Statistics II	3
PSY 510 Proseminar	3
PSY 599 Thesis	3
<i>General Psychology Requirements</i> ..	18

These 18 hours are to be 6 semester hours selected from the courses under the three content areas below. In special cases, a Readings (PSY 597) course or some other course in one of the content areas (e.g., PSY 588, Interpersonal Processes) may be substituted for one of the named courses.

<i>Developmental Psychology Courses</i>	6
PSY 573 Developmental Psychology	
PSY 574 Cognitive Development in Children	
PSY 457 Television and its Effects on Children	
<i>Cognitive Psychology Courses</i>	6
PSY 522 Advanced Cognitive Processes	
PSY 529 Perception	
PSY 524 Human Information Processing	

<i>Social Psychology Courses</i>	6
PSY 585 Experimental Social Psychology	
PSY 537 Team and Group Processes	
PSY 444 Environmental Psychology	

<i>Electives</i>	6
Six semester hours, some of which may be from other departments of the university, selected in consultation with the advisor.	
Total Semester Hours	36

COURSES OF INSTRUCTION

PSY 501. EXPERIMENTAL DESIGN AND STATISTICS I: Study of the logic of the design of experiments in psychology with special emphasis on the use of the analysis of variance. Students will be expected to perform statistical procedures on the computer using canned statistical packages. Prerequisite: undergraduate statistics. 3 sem. hrs.

PSY 502. EXPERIMENTAL DESIGN AND STATISTICS II: Further study of the logic of the design of experiments in psychology with special emphasis on the use of bivariate correlation and regression, and multiple regression. Students will be expected to perform statistical procedures on the computer using canned statistical packages. Prerequisite: *PSY 501*.

3 sem. hrs.

PSY 506. SELECTED TOPICS IN ADVANCED RESEARCH METHODOLOGY: Study of special topics in statistics, research design, behavior research methods, and computer technology. The specific topic will vary from one offering to the next. Possible topics include applied multivariate statistics, programming microcomputers for psychology experiments, evaluation research methods, program evaluation, and performance measurement. May be repeated. Prerequisite: Graduate student status in Psychology or permission of instructor.

3 sem. hrs.

PSY 510. PROSEMINAR: An extensive survey of the theories and research paradigms that comprise the science of psychology. Topics include an historical overview of the field, the structure of the modern profession, and selected current areas of application and inquiry. Prerequisite: Graduate student status in psychology or permission of instructor.

3 sem. hrs.

PSY 522. ADVANCED COGNITIVE PROCESSES: Basic research paradigms for the experimental investigation of cognitive processes, with attention to the current information-processing theories of cognition. Topics include selective attention, visual short-term memory, pattern recognition, encoding processes, imagery, search and retrieval processes, theories of human memory, and cerebral dominance. Prerequisite: Graduate student status in psychology or permission of instructor.

3 sem. hrs.

PSY 524. HUMAN INFORMATION PROCESSING: Current psychological and artificial intelligence models of

cognition. Topics include coding mechanisms in the central nervous system, simulation of sensory processes and recognition, computer models of human memory, semantic information processing by humans and machine, fast retrieval theories, recent theories of language comprehension and problem solving. Prerequisite: Graduate student status in psychology or permission of instructor.

3 sem. hrs.

PSY 526. HISTORY AND SYSTEMS: Traces the evolution of psychology since 1890. Emphasis is placed on integrating the various systems and schools of thought within the spectrum of modern psychology. (Also *PSY 471*.)

3 sem. hrs.

PSY 528. PSYCHOPHYSIOLOGY: Neurophysiology of attention, sensation, perception, emotion, learning, memory, and motor control. Emphasis on electrophysiological indicants and cybernetical analyses. Prerequisite: Graduate student status in psychology or permission of instructor.

3 sem. hrs.

PSY 529. PERCEPTION: Systematic study of methods and research findings in the field of human perception, with an evaluation of theoretical interpretations. Prerequisite: Graduate student status in psychology or permission of instructor.

3 sem. hrs.

PSY 531. HUMAN FACTORS IN SYSTEM DEVELOPMENT: Introduction to human factors during the system development process. Treats the design process from initial conceptual stages to final testing and evaluation. Emphasis is upon methods and techniques which permit development of data to support human factors functions throughout the process. Prerequisite: Graduate Student status in psychology or permission of instructor.

3 sem. hrs.

PSY 532. SPECIAL TOPICS IN HUMAN FACTORS: Wide ranging topics related to Human Factors Psychology are envisioned. For example: human tracking performance, tactual communication, vigilance, motor memory, skill development,

visual displays, technical invention, electrophysiological indicants of human performance, etc. May be repeated. Prerequisite: Graduate student status in psychology or permission of instructor.

1-3 sem. hrs.

PSY 533. ENGINEERING PSYCHOLOGY: Treatment of the relationship between problems in human factors engineering and theory-based research in experimental psychology and human performance. Topics covered include theory and research in such areas as decision making, attention, perception, and motor performance and their potential application to the design of the person-machine interface in complex systems. Prerequisite: Graduate student status in psychology or permission of instructor.

3 sem. hrs.

PSY 534. HUMAN COMPUTER INTERACTION: A critical review of human factors issues in the design of user interfaces of interactive computer systems. Emphasis will be placed on topics of cognitive engineering as they apply to user-centered systems design. Prerequisites: Graduate student status in Psychology or permission of instructor.

3 sem. hrs.

PSY 535. ERGONOMICS: Ergonomics, the study of work, emphasizes the physical aspects, capabilities, and limitations of humans. Students participate in an anthropometric measurement laboratory, employ computerized biomechanical models, and examine the literature in a specific area of interest. Prerequisite: Graduate student status in psychology or permission of instructor.

3 sem. hrs.

PSY 536. TRAINING SYSTEM DEVELOPMENT: Treatment of the systems approach to training program analysis, design, and evaluation. Topics covered include assessment of training objectives, development of training program content, selection of training media, application of simulation technology, and program evaluation procedures, including transfer of training methodology. Prerequisite: Graduate student status in psychology or permission of instructor.

3 sem. hrs.

PSY 537. TEAM AND GROUP

PROCESS: Study of group processes and theories with special application to team training, communication, performance, and coordination in human factors settings and problems. Prerequisite: Graduate student status in psychology or permission of instructor.

3 sem. hrs.

PSY 539. HUMAN FACTORS

PRACTICUM: Experience in applying the theory, methods, and data of experimental-human factors psychology to person-machine problems is acquired through placement in an approved human factors organization. Prerequisites: PSY 501, 524, 529, 531 and 533 or permission of the director of Human Factors Program. *3 sem. hrs.*

PSY 550. INTRODUCTION TO

CLINICAL PSYCHOLOGY: Introduction to interviewing skills with adults and children. Academic and applied components include supervised practice interviews and documentation. Professional components addressed include diversity, ethics, and mental health systems. Prerequisite: Graduate status in Clinical Program. *3 sem. hrs.*

PSY 551. ASSESSMENT OF

INTELLIGENCE: Theoretical rationale and techniques of individual mental testing, with emphasis on the Wechsler Scales and the Stanford-Binet. Major content areas include theories of intelligence, test development and evaluation, clinical interpretation, and current research. Prerequisite: Graduate status in Clinical Program or permission of instructor. *3 sem. hrs.*

PSY 553. THEORIES AND RESEARCH IN PSYCHOPATHOLOGY:

Survey of mental disorders with respect to their characteristics, etiology, and treatment alternatives. Emphasis is on the process of expanding knowledge through research. Practice in the use of current diagnostic classifications. Graduate status or permission of instructor. *3 sem. hrs.*

PSY 555. THEORIES OF PERSONALITY AND PSYCHOTHERAPY:

Survey and critical analysis of the

major current theories of personality and psychotherapy integrating their contributions into a diversified, functional, and adaptable approach to therapy. Graduate status or permission of instructor. *3 sem. hrs.*

PSY 556. ASSESSMENT OF

PERSONALITY: Variety of approaches to personality assessment as well as the techniques of administration and interpretation of specific instruments. Emphasis is on the MMPI-2, Rorschach, and TAT. Strategies of test construction and evaluation, ethical issues, and research are discussed. Prerequisite: Graduate status in Clinical Program and PSY 553, or permission of instructor. *3 sem. hrs.*

PSY 558. GROUP

PSYCHOTHERAPY: Survey of theories and techniques of group psychotherapy, including a review of the theoretical and empirical literature, as well as a training group experience. Prerequisite: Graduate status in Clinical Program and PSY 555, or permission of instructor. *3 sem. hrs.*

PSY 560. CHILDHOOD PSYCHOPATHOLOGY AND PSYCHOTHERAPY:

Current views of the etiology and differential diagnosis of psychopathological disorders of childhood and adolescence are examined. Relevant therapeutic approaches are presented and evaluated in relation to recent research. Prerequisite: Graduate status in Clinical Program and PSY 555, or permission of instructor. *3 sem. hrs.*

PSY 563. COGNITIVE-BEHAVIORAL THERAPY:

An examination and evaluation of the theoretical foundations and clinical applications of cognitive-behavioral models of behavior change. Prerequisites: Graduate status in Clinical Program and PSY 555, or permission of instructor. *3 sem. hrs.*

PSY 564. INDIVIDUAL PSYCHOTHERAPY:

In-depth study of the principles and techniques of dynamic, individual psychotherapy as developed from clinical and empirical findings.

Prerequisite: Graduate status in Clinical Program and PSY 555, or permission of instructor. *3 sem. hrs.*

PSY 565. ETHICS IN CLINICAL ASSESSMENT AND PSYCHOTHERAPY:

An examination of ethical theories and principles applied to clinical assessment and psychotherapy. Issues addressed include ethical frameworks, ethical codes, assessment practices, psychotherapy techniques, and common problems arising in clinical practice. Graduate status in Clinical Program or permission of instructor. *3 sem. hrs.*

PSY 566. FAMILY AND MARRIAGE THERAPY:

Survey of the major therapeutic approaches to family and marital problems and related research findings. Prerequisites: Graduate status in Clinical Program and PSY 555, or permission of instructor. *3 sem. hrs.*

PSY 567. SPECIAL TOPICS IN CLINICAL PSYCHOLOGY:

A variable topics course on issues relevant to the training of students preparing for work in clinical psychology. May be repeated with different topics. Prerequisites: Graduate status in Clinical Program or permission of instructor. *1-3 sem. hrs.*

PSY 569. CLINICAL PRACTICUM:

Experience in interviewing, psychological testing and therapy is acquired through placement in approved mental health agencies. Prerequisite: Graduate status in the clinical program. Clinical students register for one semester hour of practicum each term. To be repeated to four semester hours. *1 sem. hr.*

PSY 573. DEVELOPMENTAL PSYCHOLOGY:

The science of human development with emphasis on theory, research, methods, findings and applications. Topics selected from but not limited to personality and social development, language acquisition, problem-solving, attachment, sex roles, children's rights, moral and prosocial behavior, family relations and extrafamilial influences such as

television and schools. Prerequisite: graduate standing or permission of the instructor. *3 sem. hrs.*

PSY 574. COGNITIVE DEVELOPMENT IN CHILDREN: Major approaches to the study of cognitive development: attentional and mediational development as demonstrated in children's learning, memory, and problem solving; language development and Piaget's theory. Prerequisite: graduate standing or permission of instructor (also PSY 452.) *3 sem. hrs.*

PSY 585. EXPERIMENTAL SOCIAL PSYCHOLOGY: Designed to provide information and perspective about such social psychological topics as attitude change, interpersonal attraction, fairness in exchange, attribution, aggression, helping and intrinsic motivation. Prerequisite: graduate standing. *3 sem. hrs.*

PSY 588. INTERPERSONAL PROCESSES: Seminar in research in some prominent sub-areas of Social Psychology. Emphasis on critical skills and research ideas in topics such as non-verbal communication, self-disclosure, affiliation and attraction, and equity theory. Prerequisite: PSY 585, permission of instructor. *3 sem. hrs.*

PSY 595. SEMINAR IN SPECIAL TOPICS IN PSYCHOLOGY: Various topics of special interest to faculty and students. An intensive critical evaluation of the appropriate literature. May be repeated. Prerequisite: graduate standing or permission of instructor. *1-3 sem. hrs.*

PSY 596. EXPERIMENTAL RESEARCH: Individual graduate students explore particular research areas. Under guidance of the instructor, research projects are formulated and conducted. Project reports are required. May be repeated. Prerequisite: permission of instructor. *1-3 sem. hrs.*

PSY 597. READINGS: Designed for individual, student-faculty study in a specialized area of interest. Topic and

criteria for evaluation to be specified prior to registration. May be repeated. Prerequisite: permission of instructor. *1-3 sem. hrs.*

PSY 599. THESIS: An original research project incorporating an appropriate review of theory and literature and demonstrating competence in the application of research methodology. Required of all graduate students. *3 sem. hrs.*

Department of
RELIGIOUS STUDIES (REL)

Joseph F. Kozar, SM, Chair of the Department, and Program Director

The Department of Religious Studies is an ecumenical community of students and professors engaged in the study, research, and interpretation of religious issues. It considers these issues from the context of the more classical disciplines of the Judaeo-Christian heritage, with particular emphasis on the Roman Catholic tradition, as well as the burgeoning areas of multi-cultural and cross disciplinary concerns. It offers a Master of Arts individualized to meet each student's need, whether it be for an advanced degree or professional preparation. The student may therefore choose to follow one of two programs which lead to the Master of Arts degree.

PROGRAM IN THEOLOGICAL STUDIES

The master's program in Theological Studies offers a comprehensive approach to the study of theology and religion. Each student is expected to develop an understanding of biblical sources, historical developments, moral and contemporary theologies, especially in the Roman Catholic tradition.

Ecumenical perspectives, among Christians and world religions, provide an important matrix for study.

Concentration in Marian Studies:

A concentration in Marian Studies is available for students who take a minimum of twelve hours up to a maximum of sixteen hours in specially designated courses in this area. These designated courses are listed under Marian Studies Concentration (page 57). They are offered by the International Marian Research Institute at the University of Dayton. Students will find the world-renowned resources of the Marian Library to be most useful for their studies.

PROGRAM IN PASTORAL MINISTRIES

The master's program in Pastoral Ministries offers the student an opportunity to prepare for a variety of service careers emerging in the contemporary Church. Courses and workshops, particularly in religious education and telecommunications, family and parish ministries, and the social teachings of the Church, ensure the vitality of the program. This program, grounded in the study of theology, shaped distinctively by general principles of pastoral ministry, is open to a variety of applications. It prepares students for pastoral positions in catechetics and religious education, family, parish, and campus ministry. Taking into account the individual interests and needs of the students the program responds to contemporary pastoral needs through an integration of theory and practice.

SPECIAL RESOURCES

Students have the opportunity to draw upon the resources of other departments of the University, as well as upon the Centers of the University (the Family Center and the Center for Christian Renewal in which may be found the offices for Creative Ministry, Aging, Strategies for Responsible Development, Educational Services and

Religious Telecommunications). Interaction with an area seminary and other institutions, interchange of facilities, sharing of library resources, cooperative innovative programming, and cross-registration make available to students not only a greater variety of courses but also provide the opportunity for even more flexible construction of their degree programs.

The University of Dayton is also the home of the International Marian Research Institute which administers a doctoral program in Theology (S.T.D.) sponsored by the Pontifical Marianum University in Rome. Graduate students in the Department of Religious Studies may take courses in the Institute. Consult the chair for further information.

GRADUATE ASSISTANTSHIPS

The department offers several graduate assistantships granted on a competitive basis. They provide for tuition remission for 18 credit hours a year and an annual stipend. Write the chair for further information.

ADMISSION REQUIREMENTS

An applicant is admitted to graduate study if the admitting committee of the department is satisfied that the applicant is fully qualified to undertake graduate study. Twenty-four semester hours in philosophy and theology with a 3.0 grade-point average or their equivalent is recommended. Adjustments may be made by the chair for special situations.

PROGRAM REQUIREMENTS

Each program, though different in its internal structure, requires 36 credit hours for graduation. In the construction of a program it is expected that the majority of the student's course work will be taken in the Department of Religious Studies. A 3.0 quality point average in departmental courses and in the student's overall program is required for graduation.

Both programs in the Master of Arts are to be pursued in an individualized manner. Upon admission to the program each student is to draw up a proposal for the program to be followed. This design of course work is done in conjunction with a graduate advisor and in light of the student's needs, interests, and background. This program proposal is then submitted to the Graduate Committee of the department for its approval.

The programs leading to the master's degree may be pursued in summer sessions with courses of one to six weeks duration, or be pursued full-time, i.e., throughout the year. They must be completed within seven calendar years from the time of matriculation.

STRUCTURE OF THE PROGRAMS AND COURSE WORK

THEOLOGICAL STUDIES

Three arrangements are possible:

- (1) 36 hours of course work, with the submission to the graduate committee of the Department of a research paper done as a part of one of the courses taken between the 15th and 24th hour of course work;
- (2) 33 hours of course work and a 3 hour project; or
- (3) 30 hours of course work and a 6 hour thesis. An oral defense of the thesis is required.

PASTORAL MINISTRIES

This program is divided into three parts:

- (1) theological foundations (12-15 hours);
- (2) basic principles for effective ministry (6-9 hours); and
- (3) the practice and study of specific ministries (9-12 hours), including a practicum (3 hours) and a synthesis seminar (3 hours).

Language Proficiency

There is no language requirement for the degree. For specialization in the biblical or historical areas a working knowledge of the language employed in the area, e.g., Hebrew, Greek, or Latin, is encouraged. The language proficiency is particularly recommended for those students preparing for doctoral work.

COURSES OF INSTRUCTION

Biblical Languages

REL 501, 503. BIBLICAL HEBREW I, II: Introduction to the morphology and syntax of biblical Hebrew to facilitate the handling of basic tools and the reading of simple prose texts.

3 sem. hrs. each.

REL 502, 504. BIBLICAL GREEK I, II: Introduction to Hellenistic Greek. Vocabulary, grammar, and syntax. Selective readings of New Testament texts.

3 sem. hrs. each.

Biblical Studies

REL 511. CONTEMPORARY OLD TESTAMENT CRITICISM: Introduction to the principal methodological approaches to the Old Testament and a survey of the major results of contemporary biblical scholarship. *3 sem. hrs.*

REL 513. OLD TESTAMENT EXEGESIS: Critical study of selected writings of the Old Testament. May be taken more than once. (1) Hexateuch, (2) Historical Books, (3) Prophets, (4) Psalms, (5). Wisdom Literature, (6) Apocalyptic Literature. *3 sem. hrs.*

REL 514. OLD TESTAMENT THEOLOGY: An examination of the discipline of Old Testament theology. Special consideration to the relationship of history and theology. *3 sem. hrs.*

REL 516. CONTEMPORARY NEW TESTAMENT CRITICISM: Introduction to the major methodological approaches to the New Testament with

an emphasis on introductory matters, content, and cultural heritage.
3 sem. hrs.

REL 517. NEW TESTAMENT BACKGROUNDS: Thorough study of selected individual points, e.g., Gnosticism, Qumran, needed for an understanding of the New Testament. May be taken more than once.
3 sem. hrs.

REL 518. NEW TESTAMENT EXEGESIS: Critical exegetical study of selected writings of the New Testament. May be taken more than once. (1) Synoptics: Matthew and Mark, (2) Luke/Acts, (3) John, (4) Pauline Corpus, (5) Pastoral Epistles, (6) Book of Revelation.
3 sem. hrs.

REL 519. NEW TESTAMENT THEOLOGY: A thorough study of one theme in the theology of the New Testament. May be taken more than once.
3 sem. hrs.

Historical Theology

REL 520. HISTORY AND THEOLOGY OF THE MEDIEVAL CHURCH: Early Medieval foundations, the Carolingian Renaissance, the preparation of the 11th and 12th centuries, as well as the post-13th century movement toward nominalism, to give perspective to the High Scholasticism of the 13th century.
3 sem. hrs.

REL 521. CHRISTIAN DOCTRINE IN THE EARLY CHURCH: The development of doctrine from the post-apostolic age to the beginning of the Middle Age including the Apostolic Fathers, the Apologists, Gnosticism, Irenaeus, Marcion, Tertullian, John of Damascus, and the Schools of Antioch, Alexandria, and Cappadocia.
3 sem. hrs.

REL 522. AUGUSTINE TO OCCAM: Analysis of the life and thought of individual leaders of the Church.
3 sem. hrs.

REL 523. TRENT TO VATICAN II: Historical account of Christianity's theological response to the major

reformers and of further theological developments of Christianity in the context of philosophy, science, and political revolutions up to Vatican II.
3 sem. hrs.

REL 524. PROTESTANT CHRISTIANITY: Survey of the development of Protestant thought from the Reformation to the present. Analysis, in their own writings and their historical context, of selected Protestant theologians, such as Luther, Calvin, Knox, Cranmer, Schleiermacher, Ritschl, Harnack, and Barth.
3 sem. hrs.

Systematic Theology

REL 530. MODERN THEOLOGICAL METHODS AND MOVEMENTS: Selected theological works or movements in theology in the 19th and 20th centuries. May be taken more than once.
3 sem. hrs.

REL 534. SEARCH FOR IMMORTALITY: Study of how a variety of disciplines understand immortality. A theological evaluation of these insights with reference to traditional and prospective theology.
3 sem. hrs.

REL 535. GOD AND HUMAN EXISTENCE: A survey of Christian theologies of God, traditional and modern, and viewpoints they represent on the nature and purpose of human existence.
3 sem. hrs.

REL 537. CHRISTOLOGY: An examination of the approaches taken by contemporary theologians in discussing Jesus and his significance for Christian faith.
3 sem. hrs.

REL 540. ECCLESIOLOGY: Study of selected teachings on the nature, structure, and mission of the Church and her relationship to other Christian churches, to world religions, and to the world.
3 sem. hrs.

REL 541. THEOLOGY OF MINISTRY: Study of ministry as the right and responsibility of all Christians; Jesus' dying and rising as the unifying thread linking the description, division and chief aspects of ministry to

evangelization and the kingdom; pastoral implications of the foregoing.
3 sem. hrs.

REL 543. SACRAMENTAL THEOLOGY: Detailed study of the principle of sacramentality and of the individual sacraments, stressing the historical development of each and its contemporary renewal.
3 sem. hrs.

REL 544. SELECTED CATHOLIC DOCTRINES: An examination from several perspectives (biblical, historical, and systematic) of Catholic doctrines and dogmas, including the notion of dogma, its development, Scripture and Tradition, Papal Infallibility, Freedom of Conscience, the Marian Dogmas, and the Salvation of non-Christians.
3 sem. hrs.

REL 546. LITURGY: Study of the theological perspective on the history and the future of Christian liturgy.
3 sem. hrs.

REL 547. THEOLOGY OF CHRISTIAN DISCIPLESHIP: An examination of the meaning of Christian discipleship in light of the Scriptures and contemporary theological insights. Emphasis on the baptismal roots of the call to Christian holiness and the principal dimensions of this call.
3 sem. hrs.

REL 548. THEOLOGY OF PRAYER: Study of the meaning of prayer, focusing on prayer in the Hebrew and Christian Scriptures, prayer as reflected in selected classical mystical writers, and contemporary approaches to prayer.
3 sem. hrs.

REL 549. MARIAN QUESTION TODAY: Detailed treatment of selected issues of contemporary interest relating to the role of the Virgin Mary in the history of salvation. May be taken more than once.
3 sem. hrs.

Christian Ethics

REL 561. APPROACHES TO MORALITY: An attempt to establish the foundations of Christian morality, consisting of an historical survey of

approaches and developments from the New Testament period to the present.
3 sem. hrs.

REL 562. CONTEMPORARY MORAL PROBLEMS: An open approach to contemporary moral issues within theological perspectives.
3 sem. hrs.

REL 577. THE RELIGIOUS AND MORAL QUEST IN LITERATURE AND ART: Study of the religious and moral quest in various modes of poetry, novel, drama, film, and art with an emphasis on the form of expression.
3 sem. hrs.

Pastoral Ministries

REL 581. THEOLOGY OF REVELATION: Study of God's self-disclosure to His people as found in scripture, tradition, and the living experience of the Church immersed in history.
3 sem. hrs.

REL 582. TEACHING CHRISTIAN BELIEFS: A consideration of the issues that must be considered in the development and teaching of the basics of Christian belief—Jesus, grace, church, redemption, and sin.
3 sem. hrs.

REL 583. RELIGIOUS PSYCHOLOGY: Study of the human response to God in the light of contemporary psychology. The implications for catechesis in the various stages of human development, in the process of conversion and commitment, and in the crises of faith.
3 sem. hrs.

REL 584. CONTEMPORARY CATECHETICAL PROCESS: An attempt to identify and relate specific characteristics of various historical and contemporary approaches to religious education. Specific emphasis on the thought of authors such as Bushnell, Moran, Westenoff, and Lee, exploring their impact on developing a philosophy of religious education in a pluralistic society for the future. May be repeated for graduate credit when topic changes.
3 sem. hrs.

REL 585. PASTORAL COUNSELING: Brief study of the methods of counseling with emphasis on those modes most in practice today. Concentration on the major problems faced by counselors in the pastoral area.
3 sem. hrs.

REL 586. LEADERSHIP IN PARISH MINISTRY: Study of the traditional parish structure as seen against the background of biblical and historical perspectives on the local church. An examination of the forces for change in the contemporary parish with an effort, out of the theoretical framework of leadership and administration, to assist the student in developing a philosophy and strategy of leadership.
3 sem. hrs.

REL 587. RELIGIOUS STUDIES AS AUTOBIOGRAPHY: An invitation to reflect systematically on the religious dimension of one's own life story by asking questions about meaning, purpose, values, and identity, through the study of the lives of great religious figures. An assessment of the potential of this autobiographical approach for religious education.
3 sem. hrs.

REL 588. TEACHING MORALS AND VALUES IN RELIGIOUS EDUCATION: An integration of theory and practical techniques for teaching Morals and Values in religious education today. An exploration of Value and Moral Development with special emphasis on authors such as Piaget, Kohlberg, Erikson, Fowler, and Rokeach. May be repeated for graduate credit when topic changes.
3 sem. hrs.

REL 589. PRACTICUM: Approved supervised pastoral involvement coupled with theological reflections.
3-6 sem. hrs.

General Courses of Instruction

REL 590. SELECTED QUESTIONS: A study of specific questions and developments in biblical, historical, systematic, or catechetical theology. May be taken more than once.
3 sem. hrs.

REL 591. SPECIAL TOPICS: A graduate workshop and/or seminar investigating and analyzing a specific area of theology and interdisciplinary scholarship concerning contemporary issues.
1-6 sem. hrs.

REL 592. CONTEMPORARY ISSUES: Study of issues and subjects pertinent to Theological Studies and Pastoral Ministry. May be taken more than once.
1-6 sem. hrs.

REL 593. DIRECTED STUDY: A directed study of a particular theological, problem, or historical period. May be taken more than once.
1-3 sem. hrs.

REL 599. THESIS 6 sem. hrs.

REL 693. IMRI DIRECTED STUDY: Courses studying, analyzing, or investigating a specific area of Mariology.
1-3 sem. hrs.

Marian Studies

REL 611. MARY AND THE NEW TESTAMENT: Study of the principal New Testament texts with reference to Mary as Mother of the Redeemer, as figure of the Church, and with reference to her role in the history of salvation.
2 sem. hrs.

REL 624. MARY: PATRISTIC PERIOD: Initial development of Marian doctrine and devotion in Greek, Latin, and Oriental patristics (first six centuries).
2 sem. hrs.

REL 625. MARY: MEDIEVAL PERIOD: Study of the development of Mariology from the 7th century to the Renaissance: Marian doctrines, Marian devotions, Mary in art and liturgy, Marian feasts, and principal Marian works.
2 sem. hrs.

REL 626. MARY: MODERN PERIOD: Study of the development of Mariology from the Renaissance to the 20th century: principal Marian questions/controversies, Marian devotions, Marian shrines, Mary in art and liturgy, Marian feasts, and principal Marian works.
2 sem. hrs.

REL 630. MARY: CONTEMPORARY PERIOD: Study of the teaching of Vatican II about the Blessed Virgin Mary, especially in chapter VIII of *LUMEN GENTIUM* and its implications and developments in contemporary Marian doctrine and devotion. Recent encyclicals on Mary.

2 sem hrs.

REL 631. MARIAN DOCTRINE: Historical and theological study of principal Marian doctrines: Divine maternity, virginity, Immaculate Conception, and Assumption. Study of the question of Mary's spiritual maternity, intercession, and mediation.

2 sem. hrs.

REL 632. MARIAN SPIRITUALITY: Study of the spirituality of Mary, e.g., Mary and the Holy Spirit; Mary's virtues; Mary as first disciple of the Lord, as Servant of the Lord, and as model of the Church.

2 sem hrs.

REL 691. SPECIAL MARIAN TOPICS: A study of issues and subjects pertinent to Mariology. May be taken more than once.

2 sem. hrs.

VIII SCHOOL OF BUSINESS ADMINISTRATION

Sam Gould, Dean
Rebecca Yates,

Associate Dean and MBA Director
Jeffrey Carter, Asst. Director,
MBA Program

THE SCHOOL OF BUSINESS ADMINISTRATION AND MBA PROGRAM MISSION

As an academic unit of the University of Dayton, our fundamental mission is to produce master of business administration graduates that can competently and ethically meet the contemporary challenges of the business professions in the complex evolving global society. In order to maintain a rich intellectual climate, supplement and enrich the educational process, and meet the obligations of a university within the contemporary society, the school has three functional missions. They are (1) to achieve excellence in teaching a leading edge curriculum, (2) to make a positive contribution to the store of knowledge in the business professions and (3) to deliver high quality advisory expertise to the university, business, professional, and economic community.

The School of Business Administration's master of business administration graduates, as a result of the program's managerial focus and emphasis on active participation in cases, simulations, and related pedagogical methods, have developed the expertise to explore and employ the thought and theory of the broad base of business disciplines, engage in specialized study, profit from the resources afforded by a dynamic business community and grasp the global dimensions of today's business climate. The graduates have developed and

enhanced their ability to integrate and synthesize knowledge, to find meaning in and provide structure to complex and ambiguous issues, and to communicate effectively. Integral to these abilities is the graduate's strengthened foundation in ethical decision making and interpersonal relations. Graduates develop a sense of commitment to their continued individual growth and become qualified, competent, and confident professionals.

ADMISSION TO THE PROGRAM

The MBA Program is open to full-time and part-time students. MBA students from Columbus, Ohio can take advantage of University of Dayton courses offered in that city at Ohio Dominican College. Full-time students may apply for assistantships at the University and for intern and co-op positions established with Dayton and Columbus area companies.

An applicant for admission to the program is expected to hold a bachelor's degree from an accredited college or university. The degree may be in business administration or any other field. The initial step in the admissions process is to submit an application form to the MBA office. New students may be admitted into the program up until four weeks before classes begin, provided that all admission material has been submitted by this date. The Registrar of all colleges or universities previously attended, excluding UD, should be requested to forward an official transcript of prior academic records to the MBA office.

All students are required to submit scores attained on the Graduate Management Admission Test (GMAT). Application for the GMAT should be submitted directly to the Educational

Testing Service, Princeton, New Jersey 08541. The GMAT is given four times/year at universities throughout the country with results made available to the MBA office by the testing service. A GMAT preparatory workshop is offered twice a year at the University of Dayton.

Admission to the program is granted to students showing high promise for success in graduate business study. Indicators of high promise for success used in student evaluation are:

1. Undergraduate and other collegiate records as indicated by official transcripts from all universities and colleges attended.
2. Scores from the Graduate Management Admission Test.
3. Other factors, such as significant responsibilities or experience, are considered in granting admission to the program.

Students with an undergraduate grade point average of at least 3.0 (on a 4.0 scale) or with other evidence of high promise for success in graduate business study, may register under 'non-degree status' for one semester, during which time the student is required to complete the GMAT and submit the score to the MBA Office. Students are not permitted to register under 'non-degree status' for a second term without having taken the GMAT.

THE MBA CURRICULUM

The MBA Program is a thirty-three semester credit hour program for the student with an undergraduate background in business. For the student with a non-business background, or who lacks course work in key areas of undergraduate business study, prerequisite courses are required.

Twenty-four core semester hours

(eight courses) are prescribed for all students. Additional breadth or depth in a selected subject area may be achieved by taking three elective courses for the required program total of eleven courses.

An additional option available is the opportunity to pursue up to six hours of independent research as elective courses.

A. PROGRAM OF STUDIES

There are three classifications of courses in the program.

GROUP I—Survey Courses

GROUP II—Core Courses

GROUP III—Elective Courses

Before taking core and elective courses, the student is expected to have acquired basic knowledge in the nine business areas listed below as survey courses. Students with an undergraduate degree in Business Administration normally have met the survey course requirements and proceed with Groups II and III, core and elective courses.

Note: While it is not listed as a survey course requirement, the student is also expected to have or to acquire a background in business math, to include algebra and integral and differential calculus.

Thirty-three semester hours of core and elective courses are required for the MBA degree. Where the survey courses are required, the total number of hours required will be accordingly greater. All courses, exclusive of the surveys, must be completed within five calendar years of enrollment in the first core or elective course.

GROUP I. Survey Courses: Any student lacking course work in any one or more of the following areas or whose course work was taken seven or more years ago on a term-by-term basis is required to take the appropriate course(s) from the following survey courses.

MBA 500A Graduate Survey in Economics

MBA 500B Graduate Survey in Accounting
 MBA 500C Graduate Survey in Marketing
 MBA 500D Graduate Survey in Management and Organizational Behavior
 MBA 500E Graduate Survey in Statistics
 MBA 500F Graduate Survey in Finance
 MBA 500H Graduate Survey in Management Information Systems
 MBA 500J Graduate Survey in Production/Operations Management
 MBA 500L Graduate Survey in Organizations and Their Environment

Whenever survey courses are required, they should, when offered be completed before proceeding to core courses. However, a student may take core courses during the term in which the last survey is being completed. For example, if the student has only the Graduate Survey in Finance to take, and wishes to carry a six-semester-hour load, one of the core courses (except the Finance core course MBA 520) may be taken simultaneously with the last remaining survey course.

A survey course requirement can be waived by passing a proficiency test in the area(s). The proficiency is normally undertaken when the student has had some course work in the area(s) related to the survey course but not sufficient work to warrant its acceptance as fulfilling the course requirement, or when the student's course work is dated.

Proficiency exams are administered at no cost to the student. They are scheduled at the student's convenience by calling the MBA Office and should be taken prior to the second semester of enrollment.

Alternatively, survey requirements may be fulfilled via undergraduate work prior to matriculation into the MBA Program. For example, in Columbus, some students have elected to meet the survey requirements through undergraduate work at

Otterbein College, Franklin University, or Ohio State University. For information on appropriate undergraduate courses to waive survey requirements, contact the MBA Office.

GROUP II. Core Courses: The Core portion of the program consists of 33 semester hours (11 courses) which includes three electives.

The following eight courses are required:

MBA 501	Managerial Accounting
MBA 510	Applications of Management Science
MBA 520	Managerial Finance
MBA 530	Marketing Management
MBA 540	Managerial Economics
MBA 563	Information Systems in Organizations
MBA 587	Organizational Behavior
MBA 590	Business Policies and Administrative Management

Students with an undergraduate accounting major or a CPA should not schedule the Managerial Accounting course (MBA 501) but should instead complete an additional elective. In addition, students with an undergraduate degree in management information systems should schedule an additional elective in lieu of MBA 563 Information Systems in Organizations.

GROUP III. Elective Courses: Three elective courses are required. They may be selected to obtain program breadth or depth in a particular functional area. The student may choose from among MBA courses described on the following pages, or with permission, students may elect graduate courses from the College or other Schools of the University when these are appropriate to their education plans. For example, a student could achieve program breadth in Corporate Public Affairs by scheduling an appropriate elective from course offerings within the Department of Political Science.

B. PROGRAM CONCENTRATIONS

Selection of three elective courses in a particular area, along with the core course, results in a program concentration. The area of concentration is noted on the student's transcript. Selection of an area of concentration, if desired, is at the option of the student; however, the MBA office must be advised of the selection to provide for its administration. Examples of concentrations are:

1. Management Information

Systems (MIS) concentration.

This concentration provides the student with (a) an in-depth understanding of information technology—computers, telecommunications, artificial intelligence, office automation; and, (b) the knowledge and skills needed to become a productive end user and/or an effective information resource manager. The core course MBA 563 must be scheduled prior to pursuing this concentration. Selection may then be made from the following electives to achieve a concentration in MIS:

MIS Level One Electives

- MBA 508 Accounting Information Systems
- MBA 561 Business Expert Systems
- MBA 562 Business Telecommunications
- MBA 564 Database Management
- MBA 565 Systems Analysis and Design
- MBA 568 Special Topics in Management Information Systems

The courses in the second level are integrative or advanced in nature and are intended as a capstone experience within the MIS concentration. They have other MIS electives as prerequisites. Students with an MIS concentration are required to take one of these courses near the end of their MBA program.

MIS Level Two Electives:

- MBA 566 Management of Information Resources
- MBA 567 MIS Design Project
- MBA 569 MIS Research Seminar

2. Manufacturing Management (MFM) concentration. The MFM concentration develops for the student a firm foundation in the current and evolving principles and techniques employed by a manufacturing company. The concentration provides a business perspective on concepts such as JIT, CAD/CAM, CIM, and others. The core course MBA 510 must be scheduled prior to pursuing this concentration.

Selection may then be made from the following electives to achieve a concentration in MFM:

MFM Electives—

School of Business Administration

- MBA 507 Accounting Planning & Control Systems
- MBA 512 Just-In-Time and Quality in Manufacturing
- MBA 514 Analysis of Factory Systems
- MBA 518 Special Topics in Manufacturing Management
- MBA 519 Manufacturing Management Research Seminar
- MBA 541 Labor Relations
- MBA 561 Business Expert Systems
- MBA 575 Seminar in Personnel and Industrial Relations

MFM Electives —

School of Engineering

- MEE 580 Product and Process Automation
- MEE 581 Computer Aided Engineering
- MEE 582 Automated Design
- MEE 583 Automated Manufacturing

- MEE 584 Integrated Manufacturing Systems
- MEE 585 Design for Producibility
- ENM 515 Human Factors Engineering

In this particular area, either MBA 512 or MBA 514 must be taken as one of the three electives.

Course descriptions are provided in this bulletin.

C. COURSE SEQUENCE

The student should note carefully the requirements regarding course sequence. The student is expected to have or to acquire a background in business math, to include calculus, before entering the program. Survey courses should be completed before proceeding to core and elective courses, with the exception of combining core courses with a last remaining survey course as explained above. MBA 590, Business Policies and Administrative Management may be taken only after the completion of 21 semester hours of core courses.

D. INDIVIDUAL RESEARCH

Students who have an interest in doing specialized research should consider the course, MBA 595, Individual Research, which can qualify for one to six semester hours of credit.

The student may do the research project in an area of choice, but it should not consist of work that would normally be done during the course of a regular job. It could, however, be job related.

Before undertaking the project, the student should have a clear idea of objectives and the methodology to be employed. A literature search and development of the bibliography should precede submission of the project for approval.

Approval is obtained by completing a project proposal form available from the MBA office. The form must be submitted and approved before registering for the course. A faculty advisor is selected by the student to review and approve the proposal and to

guide the student in the research effort. The length and detail of the research-based report depend on the subject material and are to be worked out with the advisor.

Individual Research projects are to be completed within the course of one term. However, during the summer session if a student registers for MBA 595 for the first half of the session, an I, Incomplete, grade may be awarded and the project extended through the second session with faculty approval.

A student may not take MBA 595 until 15 core hours have been completed, including, if applicable, the appropriate MBA core course in the field in which research is to be conducted.

E. TRANSFER CREDIT

A maximum of six semester hours of appropriate graduate courses earned at another approved graduate school may be applied toward the MBA program at the University of Dayton. Graduate credit earned at either the University of Dayton or another school may be applied to the MBA program if such work was completed within five years prior to matriculation in the program. All coursework, exclusive of survey courses, must be completed within five calendar years of enrollment in the first core or elective course applicable to the degree.

In some cases, the credit will have been completed at another University prior to matriculation in the MBA program. To transfer this credit, a letter of request must be initiated by the student and sent to the MBA Office. Official transcripts must accompany the letter. The request should be initiated during the first term of enrollment. If approved, the credit will be transferred upon completion of 9.0 semester hours of UD MBA coursework in good academic standing.

In other cases, a student will leave the area before completing the program and will seek to transfer credit back to satisfy academic requirements off-campus. In these cases the student must obtain approval for the proposed work before enrollment. The catalog descrip-

tions of the intended courses should be submitted to the MBA Office. Consultation with an MBA Advisor is also recommended. After course approval and completion, official transcripts are required.

Transfer credit coursework must be of "B" quality or better. Quality points are not transferred.

F. TIME LIMITATION

All course work, exclusive of surveys, must be completed within five calendar years of enrollment in the first core or elective course.

G. ACADEMIC STANDARDS

The faculty of the School of Business Administration challenges MBA students to achieve high levels of performance and thus develop mature business skills and abilities.

The design and orientation of courses differ depending, among other factors, on the level of the course. Survey courses provide a curricular foundation; they may be more basic and less experiential than the higher level courses. Core and elective courses expand students' knowledge and enhance their abilities to apply this knowledge to business situations. Students are exposed to the relevant concepts, thought and theory in each course. The faculty complements and reinforces this material through applications and experiences which take the form of case analyses, simulations, projects, or other methods of learning.

The faculty requires students to demonstrate significant academic achievement and communicates these expectations to students early in each semester by setting high, realistic objectives which are reinforced in the classroom. The faculty then carefully evaluates student performance in light of these objectives, and evaluates student performance accordingly.

A 3.0 average must be attained and is required for graduation. Grading is based on a point system in which corresponding letter and quality points are:

A = 4.00 B = 3.00 C = 2.00
F = 0.00

If an "F" grade is received in a survey or core course, the student must repeat the course and achieve a passing grade.

INCOMPLETE "I" GRADE

A student in good standing in a course may, after the official withdrawal deadline (refer to the composite for the specific date), petition to the professor for an "I" grade. The professor may assign this grade if the reasons presented by the student are deemed acceptable, the student has completed a sufficient amount of course work to justify this grade in anticipation of completion of the work, and the professor and student agree to a time-phased plan of action for completing the course work.

The additional course work must be completed and graded by the end of the following regular (non-summer) term in order for the professor to assign a letter grade. If the course work is not completed by this date, or the professor has not yet submitted a final course grade, the "I" is automatically converted to an "F", thereby lowering the cumulative grade point average.

While this temporary "I" grade is on record, the student may petition to the MBA Director to withdraw from the course. If the circumstances are exceptional, the "I" grade may be replaced with a "W" by the MBA Director, in consultation with the professor.

WITHDRAWAL "W" GRADE

During the Fall and Winter terms a student may withdraw from a course without record during approximately the first three weeks of the term. During the Summer Sessions, withdrawal without record may take place during approximately the first two weeks. Thereafter, a student may withdraw with record through approximately the eleventh week of a regular term or the fourth week of a summer session. Refer to the Graduate Composite for the specific dates. After the deadline, a student may petition the

MBA Director for withdrawal consideration or the professor for consideration of an "I" grade (See I grade policy). If reasons presented are not acceptable, a letter grade consistent with the performance of work will be awarded.

AUDIT "X" GRADE

This mark indicates that the student has registered to audit the course. No credit hours or quality points are awarded. Any course taken for audit may not be retaken at a later date for credit. Therefore, a course required for graduation may not be audited.

NO GRADE "N" GRADE

No grade was reported by the instructor. Questions should be directed to the instructor.

ACADEMIC PROBATION

A student will be placed on probationary academic status if his or her cumulative grade point average is below 3.0 after completing 9 or more semester hours of graduate credit. While on probation, he or she may not transfer core or elective credit from another university or college and may not receive financial assistance administered by the School of Business Administration.

A student on academic probation whose cumulative grade point average reaches 3.0 or better within the following 9 semester hours of graduate credit is returned to good standing. Except under extraordinary circumstances, upon completion of these additional 9 semester hours of graduate credit a student will be dismissed if the cumulative grade point average continually remains below 3.0. A student who has returned to good academic standing, but whose grade point average subsequently is below 3.0 will be again placed on academic probation. A student returning to academic probation will be permitted to complete up to an additional 9 semester hours of graduate credit in order to return to good standing, provided the student does not exceed 9 semester hours beyond initial degree require-

ments and is eligible to graduate within the 5 year limit. Failing this, the student will be dismissed.

GRADE APPEALS

Occasionally a student may question the award of a grade. In such instances, a grade appeal may be initiated, provided that initiation is within 30 days following the start of the next term, and provided further that one of the following two criteria is met:

1. That the grade received appears to be inconsistent with the performance of the work required and recorded for that course;
2. That the grade received appears to be determined by criteria other than those announced as the grading system for that course.

The appeal process is initiated by consulting directly with the faculty member involved. If agreement is not reached, the appeal will be submitted in writing by the student to the MBA director with fully supporting facts and documentation.

H. THE BUSINESS ADVISORY COUNCIL

A Business Advisory Council serves to keep the academic curriculum abreast of changing requirements within the business community and to guide the educational programs of the School. It is composed of distinguished leaders in business and other professions. Members provide their time and expertise to the Dean, faculty, and students, to help maintain excellence in School activities.

I. FINANCIAL ASSISTANCE

GRADUATE ASSISTANTSHIPS

A graduate assistantship is an academic appointment normally made on the basis of half-time employment by the University. The assistant may be employed as an administrative assistant or as a research assistant. Graduate assistantships provide a stipend and remission of tuition and fees. The usual appointment is for a period of nine

months, August 16 through May 15. Renewal is awarded for a second year, contingent upon satisfactory performance.

Application forms for graduate assistantships are obtained from the MBA Office or from the Office of Graduate Applications & Records.

Only a few assistantships are awarded each year. Therefore, competition is keen. Applicants should submit their application forms at any time prior to April 1. Selections are made during April for the period beginning August 16.

DEAN'S FELLOWSHIPS

Each year a limited number of Dean's fellowships are available. To apply, the student submits a statement of approximately 1000 words emphasizing those factors which would support and merit the award of the fellowship. Criteria for the award include program qualifications, academic records, personal goals and objectives, and financial need.

NCMA SCHOLARSHIP

The National Contract Management Association (NCMA), Dayton Chapter, awards a \$500 scholarship each year. The award is made to the student with an interest in the contracting career field. Applications are available in the MBA Office.

J. ACADEMIC AWARDS

1. Each semester a "Certificate for Outstanding Academic Achievement" is awarded to those graduating students who have achieved a GPA of 3.8 or higher. The certificates are mailed to the students approximately one month following graduation.

2. The Reverend Rayond A. Roesch, S.M., Award of Excellence for outstanding academic achievement is awarded each April to the student who, during the preceding year, attained the highest academic record. The award consists of a plaque which is presented to the student plus an engraved plate displayed in the MBA Office.

COURSES OF INSTRUCTION

MBA 500A. GRADUATE SURVEY IN ECONOMICS: Basic economic principles and their application. Consumer behavior, production theory, and the interaction of buyers and sellers in various kinds of markets. National income, monetary policy, fiscal policy and the economic role of the government in the United States. *3 sem. hrs.*

MBA 500B. GRADUATE SURVEY IN ACCOUNTING: Basic accounting concepts, principles, and procedures for external financial reporting and internal use by management. The course covers material normally presented in the first year of accounting at the undergraduate level. *3 sem. hrs.*

MBA 500C. GRADUATE SURVEY IN MARKETING: Development of a framework within which the marketing process can be critically examined, including analysis of the societal and legal constraints of the marketing process. Introduction to a variety of concepts associated with the macro character of marketing including consumption systems, distribution systems, promotional activities, product development, and pricing. *3 sem. hrs.*

MBA 500D. GRADUATE SURVEY IN MANAGEMENT AND ORGANIZATIONAL BEHAVIOR: The study of management thought and practice pertaining to individual and group behavior within organizations. Topics include organization theory and design, work design, group dynamics, leadership, motivation, interpersonal communications, and control. *3 sem. hrs.*

MBA 500E. GRADUATE SURVEY IN STATISTICS: Applied statistics. Measures of central tendency and dispersion, frequency distributions, probability, sampling, hypothesis testing, analysis of variance, and simple and multiple regression analysis. Prerequisite: Business Math including Calculus. *3 sem. hrs.*

MBA 500F. GRADUATE SURVEY IN FINANCE: An overview of finance

to include the analysis of financial statements, valuation concepts, capital budgeting techniques, capital structure analysis, working capital management, and capital marketing financing instruments. Prerequisite: MBA 500B. *3 sem. hrs.*

MBA 500H. GRADUATE SURVEY IN MANAGEMENT INFORMATION SYSTEMS: A survey of the role of information technology in modern production and service organizations including basic computer hardware/software/telecommunications and experience with business software. Study of information systems and their role in supporting business problem solving and managerial decision making. Specific concepts and techniques include: data flow diagrams, system flow charts, hierarchical structure charts, and data dictionaries. Corequisites: Business Math including Calculus. *3 sem. hrs.*

MBA 500J. GRADUATE SURVEY IN PRODUCTION OPERATIONS MANAGEMENT: Study of the management principles and techniques for allocating the resources of a production or service system: facilities, equipment, time, and personnel. Topics include facility design, classical and modern inventory concepts, scheduling including PERT/CPM, quality, and others. Prerequisite: MBA 500E and Business Math including Calculus. *3 sem. hrs.*

MBA 500L. GRADUATE SURVEY IN ORGANIZATIONS AND THEIR ENVIRONMENT: A study of the social, cultural, political, and legal environments of organizations both profit and non-profit and of their impact on management at all levels. Emphasis is given to resultant problems and their resolution to include ethical considerations in the policy decision process. Prerequisite: MBA 500D. *3 sem. hrs.*

MBA 501. MANAGERIAL ACCOUNTING: Basic coverage of managerial accounting practices and techniques and of the concepts, principles and practices for internal

reporting of financial data. Prerequisites: MBA 500B and MBA 500H. *3 sem. hrs.*

MBA 504. TAX FACTORS IN BUSINESS DECISIONS: An examination of the provisions of the Federal Income Tax Code and tax laws on business decisions to include selection of the legal form of the business, acquisitions, mergers, employee compensation and benefits, and interactions of income, estate, and gift taxes. Prerequisite: MBA 501. *3 sem. hrs.*

MBA 505. CONTEMPORARY ACCOUNTING ISSUES: Seminar covering important or controversial issues for the student who has a strong accounting background. The business and financial situations which underlie accounting problems and controversies, alternative accounting techniques which are accepted or proposed, and the consequences of various accounting practices. Prerequisite: MBA 501. *3 sem. hrs.*

MBA 507. ACCOUNTING PLANNING AND CONTROL SYSTEMS: Seminar covering the accounting based information systems used by managers. Focuses on critical issues involving the provision of relevant accounting information to decision makers, to include conditions of uncertainty, and the impact of modern manufacturing and management methods on accounting systems. Prerequisite: MBA 501. *3 sem. hrs.*

MBA 508. ACCOUNTING INFORMATION SYSTEMS: A study of the design of accounting systems and their impact on management decision making and control. Emphasis is placed on a systems approach to the collection and reporting of accounting data, system internal controls, and computer applications for managerial and financial accounting. The course includes a survey of the current literature in accounting information systems. Prerequisites: MBA 501 and MBA 563. *3 sem. hrs.*

MBA 510. APPLICATIONS OF MANAGEMENT SCIENCE: Study of quantitative methods appropriate for decision making. Covers topics such as linear programming, special and integer programming, decision theory, Markov analysis, queueing theory and simulation. Involves computer use. Prerequisites: MBA 500E, MBA 500H, MBA 500J, and Business Math including Calculus. *3 sem. hrs.*

MBA 512. JUST-IN-TIME AND QUALITY IN MANUFACTURING: Study of the concepts and techniques of just-in-time manufacturing, total quality system, and statistical process control. Projects, tours, and guest speakers. Prerequisite: MBA 510. *3 sem. hrs.*

MBA 514. ANALYSIS OF FACTORY SYSTEMS: Study of the concepts and techniques of analysis, design, and management of factory production systems. Workflow layout, scheduling techniques, stochastics process models, simulations, and computerized factory models. Prerequisite: MBA 510. *3 sem. hrs.*

MBA 518. SPECIAL TOPICS IN MANUFACTURING MANAGEMENT: Advanced or special topics in the analysis, design, operation and maintenance of manufacturing systems. Topics vary. Prerequisites: MBA 510 and possibly others, depending upon the topic selected. *3 sem. hrs.*

MBA 519. MANUFACTURING MANAGEMENT RESEARCH SEMINAR: Individual research effort in conjunction with a faculty member. The seminar will meet several times during the term for research progress presentations. Prerequisite: one MFM elective. Corequisite: one other MFM elective. *3 sem. hrs.*

MBA 520. MANAGERIAL FINANCE: Study of the theories, practices, instruments and markets relevant to financial management of business organizations. Emphasis is on analysis and decision-making with regard to the acquisition, employment, and financing of business assets and on

capital market instruments. Prerequisites: MBA 500F and MBA 501. *3 sem. hrs.*

MBA 521. SPECIAL TOPICS IN MANAGERIAL FINANCE: In-depth application of financial principles to selected areas. Topics vary. Emphasis may be on working capital management; capital budgeting; the capital asset pricing model; ratio analysis; or others. Prerequisite: MBA 520. *3 sem. hrs.*

MBA 525. INVESTMENTS AND FINANCIAL MARKETS: A study of investment principles and techniques used by both individual and institutional investors. Topics include bond and stock markets, security valuation methods, portfolio theory and management and investment institutions. Prerequisite: MBA 501 or MBA 520 or instructor's permission. *3 sem. hrs.*

MBA 526. INTERNATIONAL FINANCIAL MANAGEMENT: Integrates the international monetary environment with the multinational business firm and its operations. The course covers the analysis of balance of international payments and exchange rate determination. Specific international financial management topics include export-import financing, foreign direct investment, foreign exchange risk management, financial controls and international capital budgeting. Prerequisite: MBA 520. *3 sem. hrs.*

MBA 530. MARKETING MANAGEMENT: Examination of concepts, theories, facts and analytical procedures associated with marketing management. Market analysis; consumer behavior; competitor analysis; marketing information systems; marketing research and demand forecasting; marketing strategy; product, distribution, promotion, and pricing decisions. Prerequisite: MBA 500C. *3 sem. hrs.*

MBA 535. RESEARCH FOR MARKETING DECISIONS: Integrated overview of the functional areas of

research design, data collection, data analysis and interpretation of findings, within the context of decision making for marketing. Prerequisite: MBA 530. *3 sem. hrs.*

MBA 536. SEMINAR IN INTERNATIONAL MARKET ANALYSIS: Integration of concepts, theories and analytical procedures associated with market analysis of international markets. Prerequisite: MBA 530. *3 sem. hrs.*

MBA 537. LOGISTICS MANAGEMENT: Examination of logistics systems using integrated management of transportation, warehousing, materials handling, packaging, inventory control, order processing and facility location. Examples include industrial, commercial and service organizations with various channel arrangements. Prerequisite: MBA 530. *3 sem. hrs.*

MBA 538. SPECIAL TOPICS IN MARKETING: Advanced and current topics in marketing. Topics vary. Prerequisite: Varies, depending on topic. *3 sem. hrs.*

MBA 540. MANAGERIAL ECONOMICS: Examination of the scope and method of managerial methods in demand analysis, forecasting demand, short-run cost analysis; long-run costs and production functions; pricing, selected topics in pricing; risk and uncertainty. Analysis of macro-economic trends and their impact on the firm. Prerequisite: MBA 500A, MBA 500E, and Business Math including Calculus. *3 sem. hrs.*

MBA 541. LABOR RELATIONS: Collective bargaining, wage determination, structure and operation of labor markets, direction of the labor movement, theories of industrial peace and conflict; current problems and trends in labor relations. Prerequisite: MBA 500D. *3 sem. hrs.*

MBA 545. NATIONAL ECONOMIC POLICY AND FORECASTING: A study of economic aggregates including employment, prices and income.

Contemporary policy issues such as stagflation, wage and price controls, structural unemployment. Methods of forecasting economic aggregates. Prerequisite: MBA 500A. 3 sem. hrs.

MBA 548. SPECIAL TOPICS IN ECONOMICS: Advanced and current topics in Economics. Topics vary. Prerequisites: MBA 540 and others, depending on topic. 3 sem. hrs.

MBA 550. GOVERNMENT AND BUSINESS: Analysis of government regulations and their impact on business. An examination of how business organizations, when producing goods and services, operate within the financial, legal and social constraints resulting from governmental activity. Prerequisite: MBA 500D. 3 sem. hrs.

MBA 560. OPERATIONS MANAGEMENT: (Now MBA 500J).

MBA 561. BUSINESS EXPERT SYSTEMS: Study of expert and knowledge-based systems and their applications. Basic structure, knowledge acquisition, knowledge representation, and system construction and implementation. PRO-LOG and/or other software exercises and projects. Prerequisite: MBA 563. MBA 510 desirable but not mandatory. 3 sem. hrs.

MBA 562. BUSINESS TELECOMMUNICATIONS: Study of computer-based communication systems and their impact on business organizations. Basic concepts, communication networks, standards and protocols, security and control. Prerequisite: MBA 563. 3 sem. hrs.

MBA 563. INFORMATION SYSTEMS IN ORGANIZATIONS: In-depth overview of organizational informational systems. Concepts, technologies, and techniques for understanding the analysis, development, and management of these systems. Prerequisite: MBA 500H and Business Math including Calculus. 3 sem. hrs.

MBA 564. DATABASE MANAGEMENT: Introduction to computerized databases and their management. Data organization and processing techniques, major data models, database management systems, logical and physical database design, and administration of database resources. Prerequisite: MBA 563. 3 sem. hrs.

MBA 565. SYSTEMS ANALYSIS & DESIGN: Study of the concepts and techniques of the information systems development life cycle and other development methodologies. Information requirements determination, structures analysis techniques, system design tools, prototyping, system implementation. Cases and the use of a CASE tool. Prerequisite: MBA 563. 3 sem. hrs.

MBA 566. MANAGEMENT OF INFORMATION RESOURCES: Focus is on the strategic and management issues associated with the effective use of information technology. Role of the chief information officer, strategic planning, the technology transfer process, project management, end user computing, and operations management. Cases and readings. Prerequisite: One other MIS elective. 3 sem. hrs.

MBA 567. MIS DESIGN PROJECT: Student team experience with an MIS development project for an actual organization. Project definition and planning, systems analysis, design specifications, and implementation. Several team technical reports and presentations. A capstone experience for the MIS concentration. Prerequisite: One other MIS elective. 3 sem. hrs.

MBA 568. SPECIAL TOPICS IN MANAGEMENT INFORMATION SYSTEMS: Advanced and current topics in management information systems. Topics vary. Prerequisites: MBA 563 and others, depending on topic. 3 sem. hrs.

MBA 569. MIS RESEARCH SEMINAR: Individual research efforts in conjunction with an MIS faculty member. The seminar will meet several times during the term for research

progress presentations. Prerequisite: one MIS elective. Corequisite: one other MIS elective. 3 sem. hrs.

MBA 571. ORGANIZATIONS AND THEIR ENVIRONMENT: (Now MBA 500L).

MBA 572. SOCIAL RESPONSIBILITY AND ETHICAL DIMENSIONS OF MANAGEMENT: Study of social responsibility and ethics. Topics include the relationship of management to society, ethical issues in management, strategic management for social responsiveness, and the stakeholder management concept. Prerequisite: MBA 500D. 3 sem. hrs.

MBA 575. SEMINAR IN PERSONNEL AND INDUSTRIAL RELATIONS: A study of the personnel and industrial relations function. An examination of employment planning and practices to include the legal framework and regulatory guidelines. Readings, exploratory research, experimental exercises, films, and seminar discussions are the primary teaching methods. Prerequisite: MBA 500D. 3 sem. hrs.

MBA 580. ORGANIZATION THEORY AND ANALYSIS: Analysis of the components of an organization and the processes which integrate them into a functioning unit in pursuit of growth, stability, and ultimately survival. Emphasis is on modern organization theory. Extensive reading, exploratory research, and seminar discussions are integral aspects of the course. Prerequisite: MBA 500D. 3 sem. hrs.

MBA 584. INTERNATIONAL BUSINESS POLICY: Changes in the structure, organization, and policies of multi-national business firms and international trade in general. Their implications relative to the composition of exports, international marketing processes, terms of trade and determinants of payments and exchange-rate movements. Prerequisite: MBA 500D. 3 sem. hrs.

MBA 586. INTERPERSONAL DYNAMICS IN ORGANIZATIONS: The nature, types, formation and characteristics of groups that interact within an organization. Communication networks and organizational factors that influence interpersonal relationships and conflicts are discussed in depth. Lectures, outside reading, research, cases and group exercises. Prerequisite: MBA 500D 3 sem. hrs.

MBA 587. ORGANIZATIONAL BEHAVIOR: Individual behavior and interrelationships in an organization, and management practices to promote organizational effectiveness. Basic psychological concepts such as motivation, leadership and the application of techniques for individual and organization growth. Lectures, reading, cases and problem-solving through group exercises. Prerequisite: MBA 500D 3 sem. hrs.

MBA 588. SPECIAL TOPICS IN MANAGEMENT AND ORGANIZATIONAL BEHAVIOR: Analysis and interpretation of research studies as applied to management. Coverage of issues such as leadership, interpersonal conflict resolution, resistance to change, managerial development, organizational growth, effects of technology, and emergence of new control systems. Role playing, small group exercises, and applications. Prerequisite: MBA 586 or MBA 587. 3 sem. hrs.

MBA 589. SEMINAR IN STRATEGIC PLANNING: Study of the Strategic Management processes in theory and practice using text, current literature, cases, and company studies. Class meetings will be primarily group discussion with some lectures by instructor and reports by students. Prerequisite: 21 semester hours of core and elective courses. 3 sem. hrs.

MBA 590. BUSINESS POLICIES AND ADMINISTRATIVE MANAGEMENT: The integration of theory and practice in the development of business policies. Emphasis is on the problems of executive management, decision-

making and administrative action. Prerequisite: 21 semester hours of core courses, including MBA 520. 3 sem. hrs.

MBA 591. BUSINESS SIMULATION: An integrative learning experience based on knowledge of the functional business areas and of the business environment. The course uses a computer simulation to examine the effect of students' management decisions over time. Lectures and small groups for decision-making reporting. Prerequisite: 21 semester hours of core and elective courses. 3 sem. hrs.

MBA 592. NEW VENTURE MANAGEMENT: A study of entrepreneurship and the development of opportunities in new or renewed businesses. Focus is on identifying and analyzing business opportunities, locating and obtaining venture capital, development of a business plan, managing growth in the enterprise, and the decision making, risk taking, and leadership styles of entrepreneurs. Prerequisite: 21 semester hours of core and elective courses. 3 sem. hrs.

MBA 595. INDIVIDUAL RESEARCH: Individual research in subjects encompassed by the M.B.A. curriculum under the guidance and direction of a faculty member. Research may be undertaken upon completion of 15 hours of core courses. 1-6 sem. hrs.

MBA 598. SPECIAL TOPICS IN BUSINESS ADMINISTRATION: Advanced and current topics in Business Administration. Topics vary. Prerequisites: Depending on Topic. 3 sem. hrs.

The following two courses are currently offered under MBA 598 and are identified by section and/or title.

DAYTON HUMANITIES INSTITUTE/MBA: This is a weekend course designed for in-depth discussions of ethics, values, and justice based on your study of art, literature, philosophy, and history. Throughout the course, issues are assessed from the perspective

of the business professional. \$100 fee. Prerequisites: Completion of all survey work plus one term of core level work. 3 sem. hrs.

CORPORATE ISSUES AND SURVEY PRACTICUM: This course provides the students with an overview of management concepts, principles and functionality as they are practiced by major corporations. Each student has the opportunity to develop an innovative alternative to a current issue related to corporate finance, marketing, and/or management. The course is taught by a team of corporate executives. Prerequisites: Completion of all survey work. 3 sem. hrs.

COURSES OUTSIDE THE SCHOOL OF BUSINESS

ENM 515. HUMAN FACTORS ENGINEERING: Introduction to the human factors criteria that should be considered in the design of man-machine systems, work situations, and man's physical environment. 3 sem. hrs.

MEE 580. PRODUCT AND PROCESS AUTOMATION: General introduction to the modern techniques utilized in mechanical product and manufacturing process design. Topics in the various technologies associated with CAE/CAD/CAM/CIM. 3 sem. hrs.

MEE 581. COMPUTER-AIDED ENGINEERING: Treatment of topics associated with the initial design, analysis and stimulation phase of the product development process. Development and use of analysis and stimulation tools. 3 sem. hrs.

MEE 582. AUTOMATED DESIGN: Perform activities associated with the detailed design, drafting, and documentation of mechanical parts and components. Address system programming, system management requirements, modeling techniques and data base requirements. 3 sem. hrs.

MEE 583. AUTOMATED MANUFACTURING: Treatment of topics associated with manufacturing engineering functions and issues in automation. Discuss numerical control, process planning, quality assurance, process simulation, manipulators, and other related technologies. *3 sem. hrs.*

MEE 584. INTEGRATED MANUFACTURING SYSTEMS: Address topics associated with the design, implementation, planning and control of fixed and flexible manufacturing and assembly systems in conjunction with communications and computer technologies. Discuss issues associated with group technology and systems integration. *3 sem. hrs.*

MEE 585. DESIGN FOR PRODUCIBILITY: Concurrent treatment of product design and manufacturing process issues. Application of various methodologies, tools and evaluation schemes on various product design, manufacturing, and assembly related activities. *3 sem. hrs.*

MTH 445. QUANTITATIVE METHODS: This course provides an overview of the role of mathematical methods in modern production and service organizations. The mathematical theories of simultaneous equations, matrices, differential calculus and integral calculus with applications to the management of production systems are included. Fulfills business math requirement. *3 sem. hrs.*

THE JD/MBA JOINT DEGREE

THE BASIC PROGRAM STRUCTURE

While the specifics of the program structure and requirements are determined for each student through individual consultation, the basic design is applicable to all students. The first year is taken entirely in Law

School and covers the same prescribed courses for all Law students. Course work in the second and third years is distributed between Law and MBA courses and sequenced in a manner to achieve the maximum benefit of integrated progression in the two fields. The fourth year consists largely of Law courses to complete the JD requirements. The student with a business administration undergraduate degree can normally expect to complete all requirements for both degrees by the end of the first term of the fourth year. Those with undergraduate degrees in other fields normally require additional hours for prerequisite courses for the MBA. In such cases, the student can expect to complete requirements for both degrees in four full school years. In either case, while all the basic requirements of each degree are fulfilled through the joint program, the designation of certain courses as common electives results in completion of the entire program in one term less than would be required if each degree program were pursued independently. Upon completion of the program, the two degrees are conferred.

ADMISSION TO THE PROGRAM

Students applying for the program must meet the admission requirements of both the Law School and the School of Business Administration. Application for admission should be submitted to each of the schools, along with other records and data required by each school. The applicant should indicate on each application that admission is sought for the joint program. Upon admission to both degree programs, the student will, in effect, be enrolled in the JD and MBA programs simultaneously. Applicants should contact the offices of the Deans of both schools for information and application for admission. The first year of work is in the Law School, so it is advisable to contact the Dean of the Law School early.

School of Law (513) 229-3211;
School of Business Administration
(513) 229-3733

ACCELERATION OF THE PROGRAM

The student may accelerate the joint degree program by attending summer sessions. Both Schools offer courses during the summer. It is possible to complete the requirements for both degrees in three calendar years through such acceleration.

PROGRAM PLANNING

Upon admission to the joint degree program, each student is required to meet with the program advisor to plan his/her program. Continuous liaison must be maintained with the program advisor throughout the program. The student will be assigned an advisor from both the Law School and the School of Business Administration.

IX SCHOOL OF EDUCATION

Ellis A. Joseph, Dean
Joseph F. Rogus, Associate Dean

The basic mission of the Graduate School of Education is to prepare competent and compassionate professionals in several fields. Specifically, the mission is to prepare teacher and administrative leaders, exercise scientists, and human service specialists. The Graduate School is further committed to preparing scholar-practitioners at the Ph.D. level in the area of educational leadership. The School of Education programs leading to graduate degrees are designed primarily to meet the following purposes:

1. To develop advanced proficiency in elementary and secondary school teachers who have completed recognized baccalaureate teacher education programs.
2. To enable individuals to qualify for certification as principals, supervisors, and superintendents.
3. To prepare qualified school counselors, school psychologists, and counselors for social agencies.
4. To develop personnel for student services in higher education.
5. To prepare educational research specialists.
6. To enable students with nonprofessional education baccalaureate degrees and above-average academic records to gain teacher certification.

In implementing the graduate program, faculty are committed to help students:

- understand the knowledge base that undergirds their field of interest;
- apply their knowledge base to practice;
- value the relationship of theory to practice;

- reflect mindfully upon professional practice;
- value community and collaboration;
- appreciate the moral dimensions of their work; and
- commit themselves to improving the quality of life within schools and the larger community

In working to address the mission, faculty and staff in all departments endeavor to:

- create a supportive environment for learning;
- respond to individual students' program needs;
- draw upon the knowledge base of their field in providing quality instruction;
- maintain high academic standards;
- provide students the opportunity to choose a research or a practice emphasis in their academic program;
- contribute to the knowledge base of their field;
- assist the community in translating the knowledge base of their field to everyday practice;
- serve as responsible social critics;
- demonstrate collaborative teaching and inquiry behaviors; and
- engage in professional activity focused on the improvement of school and community life.

Most graduate programs lead to the Master of Science in Education degree. Other degree programs include the Master of Science in Teaching, the Ed.S. and the Ph.D. in Educational Leadership.

AUTHORIZATION

The University of Dayton's offerings in graduate work leading to the Master

of Science in Education have the official approval of the State of Ohio Department of Education and of the National Council for the Accreditation of Teacher Education.

ASSISTANTSHIPS

The School of Education offers a limited number of assistantships. For information about these assistantships see the respective chair of the department in which the assistantship is sought.

ADMISSION

General Requirements

The School of Education accepts into its graduate programs applicants who can present undergraduate records showing them capable of meeting the standards of graduate work. An applicant (1) must hold a bachelor's degree from an accredited institution (at least state and regional accreditation), unless specific exceptions are granted by the Dean of the School of Education; and (2) must have attained an undergraduate cumulative average of 2.75 or higher on a 4.0 scale. Applicants who do not satisfy the grade point criterion may be admitted if they achieve a minimum score of 40 or higher on the Miller Analogies Test (MAT) or scores of 430 and 490 respectively on the verbal and analytical sections of the Graduate Record Exam (GRE). Students must be formally accepted prior to the completion of 12 quarter hours. Should a student accumulate more than 12 quarter hours without formal acceptance, hours earned in excess of 12 will not be accepted toward completion of the degree. All applicants must submit three references from qualified professionals.

Special Requirements: School Psychologist Program

Besides meeting the above requirements, an applicant for the School Psychologist Program must receive a favorable recommendation from the Department of Counselor Education and Human Services. In deciding whether to make such a recommendation, the faculty will take into account the applicant's physical and mental health, personality adjustment, and general character as determined by reference appraisals and other appropriate requirements which are in accordance with department policy.

Special Requirements: Master of Science in Teaching

The program leading to the Master of Science in Teaching is restricted to the student who (1) holds a bachelor's degree; (2) has an undergraduate cumulative point average of 2.75 or higher (on a 4.0 scale); (3) does not have a teaching certificate; (4) desires certification to teach; (5) has a major teaching field which can be serviced by graduate courses offered at the University of Dayton.

MASTER'S DEGREE PROGRAMS

Advising

The graduate student has access to two sources for official advisement:

1. The chairs of the departments or the directors of the programs act as special advisors to students enrolled in programs under their jurisdiction. They counsel them with regard to their professional objectives, their selection of courses, and program options available. The student is urged to confer with the chair and/or director in the first term of enrollment.
2. The project or internship advisor, chosen by mutual agreement of the student, the department chair, and the prospective advisor, guides the student to the successful completion of the research project or the approved internship.

Academic Standing

To qualify for graduation, a student must achieve a grade point average of at least 3.0 (B) in all work undertaken toward the degree.

Research Project or Internship Report

At least ten days before graduation, the student must submit, according to the requirements of the specific program, three acceptable copies of the research project and two copies of an abstract of the project; OR one acceptable copy of a formal report on the internship experience; OR, in the case of Plan C in the School Counseling program, one copy of the research paper.

Departmental Conference

During the term of graduation, the student must participate in a formal departmental conference as arranged by the appropriate department chair.

Employed Graduate Students

The maximum course load permitted for any graduate student who is fully employed is nine quarter hours for the first and second terms and for the first half of the third term. Adjustments to this policy are made on an individual basis in the cases of those not employed or partly employed.

Workshop Credit

No more than 8 quarter hours of workshop credit may be applied toward a degree.

Registration Dates For Courses At Off-Campus Sites

Students taking graduate courses at off-campus sites of the School of Education should note that registration dates for courses at these sites are different from the registration date for courses taken at the University of Dayton campus.

Credit System

All graduate credits in the School of Education are counted in quarter hours; these are converted into semester hours when required.

"I" and "P" GRADES

The "I" grade may stand for a period of *no more than one year* from the end of the term in which the grade was assigned. If the grade is unchanged after one year, it has permanence, and the course must be retaken.

The "P" grade may stand for a period of *no more than two years* from the end of the term in which the grade was assigned. If the grade is unchanged after two years, it has permanence, and the course must be retaken.

Department of COUNSELOR EDUCATION AND HUMAN SERVICES (EDC)

Eugene K. Moulin,
Chair of the Department

The goals of the Department of Counselor Education and Human Services are:

1. To prepare elementary and secondary school counselors, student service personnel in higher education, school psychologists, school social workers, directors of pupil personnel services, guidance supervisors for state, county, and local systems, and counselors for community and other agency settings.
2. To provide teachers and other helping professionals with specific in-service course credit offerings designed to build skills and develop understandings relative to identified professional functions. These two missions are conducted at the University of Dayton campus, Lima, Columbus, Rio Grande, and other sites by invitation of local authorities.

The Department offers seven emphases at the graduate level:

- School Counseling
- Child/Youth Development Specialist
- School Social Worker

College Student Personnel Services
Counseling
Social Agency Counseling I
Social Agency Counseling II
School Psychology

In addition, selected courses in behavioral and social science and other related disciplines lead to provisional certification as a school counselor, school social worker, and school psychologist; as well as to Professional Counselor licensure and Professional Clinical Counselor licensure for social agency personnel.

True to Marianist ideals, the faculty is committed to developing the human service practitioner as a skilled facilitator of individual and community growth and as a person knowledgeable of self and children, and youth and adults from varying socio-economic backgrounds.

ADMISSION REQUIREMENTS

In addition to the general requirements of the School of Education, the Department of Counselor Education and Human Services may require that an applicant who has an undergraduate quality-point average below 2.75 of a possible 4.0 provide additional documentation in the form of an essay describing educational and other relevant achievements, and occupational goals. See special requirements in footnotes to individual programs.

SCHOOL COUNSELING

General Requirements

Plan A: 50 quarter hours
Research project
Report, Field Experiences
course
Exit Examination, EDC 600

Plan B: 50 quarter hours
Report, Field Experiences
course
Exit Examination, EDC 600

Plan C: 50 quarter hours
Paper, Research Methodology course, EDT 503
Report, Field Experiences
course
Exit Examination, EDC 600

Recommended Sequence of Courses

Quarter Hours

1. **Guidance: Services, Personnel, Organization, Ethics, Law**
(One Course Required)
EDC 522 Introduction to Guidance and Counseling. 3
EDC 539 Administration of Pupil Personnel Services 3
EDC 580 Guidance in the Elementary School 3
2. **Social and Cultural Foundations**
(Required)
EDC 530 Psychology of Individual Differences. 4
3. **Human Development** (Required)
EDC 531 Psychology of Personality Development 3
EDC 532 Psychology of Learning Disabilities and other Exceptionalities 4
*Student certified in LD will take another counseling course.
4. **Philosophy**
EDT 502 Philosophical Studies in Education (Required). ... 4
or
EDC 544 Philosophical, Professional, Ethical, and Legal Aspects in Counseling (Elective) 3
5. **Appraisal of the Individual**
(One Course Required)
EDC 533 Psychometrics 3
EDC 535 Test Interpretation and Case Studies 3
6. **Counseling Theories and Techniques of Counseling** (Required)
EDC 543 Theories and Techniques of Counseling 4
7. **Group Dynamics, Processing, Counseling** (Required)
EDC 583 Theories and Techniques of Group Counseling 4
Prerequisite: EDC 543
8. **Lifestyles and Career Development** (One Course Required)
EDC 524 Educational and Occupational Information in Counseling 3

- EDC 525 Independent Research: Community Resources . 3
EDC 528 Career Education 3
EDC 529 Psychology of Life Styles & Career Decision Making 3
EDC 655 Career Guidance Institute 3

9. **Research and Evaluation**
(One Course Required)
EDA 513 Evaluation of Educational and Organizational Systems. 4
EDT 503 Educational Research Methodology 4
Prerequisites: EDC 524, 533, 543, 583
10. **Practicum & Field Experience**
(Required)
EDC 545 Practicum: Counseling Techniques. 5
(Second last course before EDC 600)
EDC 599 Field Experiences in Counseling 4
(Last course before EDC 600)

11. **Preparation for Ohio School Counselor Certification Exam**
EDC-600 Preparation for State Exam* 2
*Required preparation: last course after fulfilling all above course requirements for a master's degree. Student not seeking Ohio certification may take another counseling course.

Some Electives

Courses

Quarter Hours

- EDC 574 Independent Studies in Personnel Services 1-6
EDC 602 Counseling Seminars 1-6
EDC 635 Marriage & Family Counseling 4
Prerequisites: EDC 543, EDC 583
EDT 501 Learning Theory and Education 4
EDT 504 Human Development and Education. 4
EDC 578 Consultation in the Schools. 4
Prerequisite: EDC 522 or EDC 580 or EDC 539
EDC 581 Techniques of Child Counseling. 3

Prerequisite: EDC 543—recommended EDC 580
 EDC 673 Counseling Multiethnic Populations 3
 Prerequisite: EDC 543—recommended EDC 522 or EDC 580

Note: To become a Certified School Counselor, a student must:

1. Be a certified teacher.
2. Have three years of successful teaching experience.
3. Have completed a minimum of 45 graduate quarter hours in Counseling courses which cover the ten areas decreed by the State.
4. Have a master's degree.
5. Achieve success on the State Department of Education exam.
6. Apply for School Certification to the State Department of Education through the office of the Dean.

Note: A student wishing to be a Licensed Professional Counselor (LPC), must:

1. Have a degree entitled "Counseling."
2. Have completed a total of 60 quarter hours in Counseling courses spread over the areas specified by the State of Ohio Counselor and Social Worker Board. Please see areas under Social Agency Counseling Program II.
3. Meet the requirements for supervised experience in counseling required by and approved beforehand by the State.
4. Achieve success on the competency exam given by the State of Ohio.

Note: A student wishing to be a Licensed Professional Clinical Counselor (LPCC), must fulfill all requirements as specified under Licensed Professional Clinical Counseling.

TEACHER AS CHILD/YOUTH DEVELOPMENT SPECIALIST

This program is designed to qualify Elementary and Secondary School Teachers for the Eight-Year Professional Teaching Certificate from the Ohio State Department of Education.

General Requirements
 45 quarter hours
 Planned Field Project, EDC 597 or Report, Field Experiences in Personnel Services, EDC 599
 Exit Examination in EDC 600

Recommended Sequence of Courses

1. **Social and Cultural Foundations (Required)**
 EDC 530 Psychology of Individual Differences 4
2. **Human Development (Required)**
 EDT 504 Human Development in Education 4
 EDC 531 Psychology of Personality Development 3
 EDC 532 Psychology of Learning Disabilities and Other Exceptionalities 4
 *Student certified in LD will take a counseling course.
3. **Philosophy**
 EDT 502 Philosophical Studies in Education (Required) 4
 or
 EDC 544 Philosophical, Professional, Ethical, and Legal Aspects in Counseling (Elective) 3
4. **Academic Education (Required)**
 EDA 511 Curriculum 4
5. **Career Development & Community Resources (One Course Required)**
 EDC 524 Educational & Occupational Information 3
 EDC 525 Independent Research: Community Resources .. 3
 EDC 528 Career Education 3
6. **Appraisal of Individual & Case Studies (Required)**
 EDC 535 Test Interpretation & Case Studies 3
7. **Individual Dynamics, Counseling (Required)**
 EDC 543 Theories and Techniques of Counseling 4
8. **Research and Evaluation (One Course Required)**

EDT 503 Educational Research Methodology 4
 EDA 513 Evaluation of Educational & Organizational Systems 4

*A student may take EDT 503 or EDA 513 only after having completed 15 to 20 quarter hours in other coursework.

9. **Field Experiences (One Course Required)**
 EDC 597 Planned Field Project 4
 EDC 599 Field Experiences in Personnel Services (Sch. Cnsl. Cert. Req.) .. 4

*All other required courses should have been taken before enrollment in Field Experiences or Planned Field Project.

Please see description of Planned Field Project in Departmental Brochure.

Suggested Electives

EDC 602 Counseling Seminars:
 Youth Suicide
 Teen Pregnancy
 Alcohol & Drug Abuse
 Helping the Latch-Key Child
 Indicators of Potential "At-Risk" Children
 Child Abuse
 Impact of Poverty on Family
 Family Violence
 Children of Divorce
 Eating Disorders
 Building Self-Esteem
 Crisis Counseling
 Multi-Cultural Education
 Sex-Equity

SCHOOL SOCIAL WORKER

General Requirements

50 quarter credit hours
 Report, Field Experiences in School Social Work, EDC 653
 Exit Examination in EDC 600

Recommended Sequence of Courses Quarter Hours

1. **Guidance: Services, Personnel, Organization (One Course Required)**
 EDC 522 Introduction to Guidance and Counseling 3
 EDC 539 Administration of Pupil Personnel Services 3

2. Human Growth and Development (Two Courses Required)

EDC 531 Psychology of Personality
Development 3
OR

EDT 504 Human Development in
Education 4

EDC 532 Psychology of Learning
Disabilities & Other
Exceptionalities 4

*Student certified in LD will take an
exceptionalities course

3. Educational Psychology (Required)

EDC 530 Psychology of Individual
Differences..... 4

4. Testing and Measurements (One Course Required)

EDC 533 Psychometrics. 3

EDC 535 Test Interpretations and
Case Studies 3

5. Counseling Theories and Tech- niques (Required)

EDC 543 Theories and Techniques
of Counseling 4

6. CORE: Philosophy, Ethics, Law, Evaluation, Research (Two Courses Required)

EDC 544 Philosophical, Profes-
sional, Ethical, Legal
Aspects of Counseling .. 4

EDT 503 Educational Research
Methodology 4
OR

EDA 513 Evaluation of Educational
and Organizational
Systems. 4

7. School and Community Resources (Required)

EDC 525 Independent Research:
Community Resources .. 3

8. Family Counseling (Required)

EDC 635 Marriage and Family
Counseling 4
Prerequisite: EDC 543

9. Juvenile Delinquencies: Policies, Procedures, Practice (Required)

EDC 523 Delinquents and Juvenile
Court 2

10. Practicum (Required)

EDC 653 Field Experiences in
School Social Work 5
(Last course to be taken)

Suggested Electives

Quarter Hours

EDC 574 Independent Studies in
Personnel Services 1-6

EDC 583 Theories and Techniques
of Group Counseling 4
Prerequisite: EDC 543 or
EDC 581

EDC 581 Techniques of Child
Counseling. 3

EDC 602 Youth Suicide 1

EDC 602 Drug and Alcohol Abuse 1

EDC 602 Children of Divorce 1

EDC 602 Eating Disorders 1

EDC 602 Teenage Pregnancy. 1

EDC 602 Crisis Counseling 1

EDC 602 Counseling the Single-
Parent Family 3

EDC 602 Child Abuse 1

EDC 602 Identification of the

Gifted 1

EDC 602 Building Self-Esteem 1-6

EDC 602 Value Clarification 1

EDC 673 Counseling Multiethnic
Populations 3

NOTE: TO BECOME A CERTIFIED
SCHOOL SOCIAL WORKER, A
STUDENT MUST:

1. Be a certified teacher; in addition
2. Have one year of successful teaching
experience; and

3. A Master's degree in Education with
30 quarter hours of graduate level
course work well distributed over
the areas of education and psychol-
ogy of normal and exceptional
children, pupil personnel services,
and counseling; and

4. A graduate level social work
practicum of at least ten weeks in an
approved or chartered school or
school district

OR

1. A Master's of Social Work degree
(MSW); in addition to

2. 18 quarter hours of graduate level
course work well distributed over the
areas of education and psychology of
normal and exceptional children, pu-
pil personnel services, and counsel-
ing;

3. A graduate level social work practicum
of at least ten weeks in an approved or
chartered school or school district.

ALSO

1. Achieve success on the State Depart-
ment of Education exam.

2. Apply for School Social Worker certi-

fication to the State Department of
Education through the office of the
Dean.

COLLEGE STUDENT PERSONNEL SERVICES COUNSELING

General Requirements

60 quarter hours

Reports, Internships, EDC 553

Exit Examination in EDC 600

Program for Full-Time Students and for
Staff Members

Recommended Sequence of Courses

Quarter Hours

1. Human Development (One Course Required)

EDC 531 Psychology of Personality
Development 3

EDT 504 Human Development in
Education 4

EDC 532 Psychology of Learning
Disabilities & Other
Exceptionalities 4

2. Social and Cultural Foundations (Required)

EDC 530 Psychology of Individual
Differences 4

3. Philosophy, Professional, Ethics, Law

EDC 544 Philosophical, Profes-
sional, Ethical, Legal
Aspects
of Counseling 3

4. General Administration, Objec- tives, Services, Trends

EDC 551 Independent Readings
and Field Work in
College Student Person-
nel Services 3

EDC 552 Research: College
Student Personnel Service
Issues 2

5. History of American Colleges/ Universities (Required)

EDT 512 History of Higher
Education in U.S. 4

6. Appraisal of Individual (Required)

EDC 533 Psychometrics 3

7. Life Styles and Career Develop- ment (Required)

EDC 529 Psychology of Life Styles
and Career Decision
Making 3

- 8. **Counseling Theories and Techniques (Required)**
EDC 543 Theories and Techniques of Counseling 4
- 9. **Group Dynamics, Process (Required)**
EDC 583 Theories and Techniques of Group Counseling 4
- 10. **Research, Statistics, Proposal Writing, Evaluation (One Course Required)**
EDA 513 Evaluation of Educational and Organizational Systems 4
OR
EDT 503 Educational Research Methodology 4
- 11. **Practicum (Required)**
EDC 545 Practicum: Counseling Techniques 5
Prerequisite: all required Counseling courses
- 12. **Internships in College Student Personnel Services (Three Internships Required)**
EDC 553 Internship in College Student Personnel Services 9
(Usually first internship will be taken during student's last trimester at U.D.)
(Three internships, 3 credit hours each, one internship per trimester)

Notes: Students in Business, Engineering and other fields may take this program. Internships must be taken during regular office hours of the services, usually mornings and early afternoons. Summer internships start in May. Courses EDC 551, EDC 552, and EDT 512 are not given during the summer and only given on the Main campus. Internships may be taken only in metropolitan Dayton and Lima. An Applicant must have a minimum of 2.8 point average (4.0 base).

Some electives: EDC 602 Seminars

SOCIAL AGENCY COUNSELING I
(Human Resources Counseling)

For Clergy, Lay Pastoral Ministers, Nurses, Business Personnel, and others not seeking State Licensing.

General Requirements
45 quarter hours
Report, Field Experiences, EDC 598
Exit Examination in EDC 600

Recommended Sequence of Courses

- 1. **Human Development (One Course Required)**
EDC 530 Psychology of Individual Differences 4
EDC 531 Psychology of Personality Development 3
- 2. **Philosophy, Profession, Ethics, Law (Required)**
EDC 544 Philosophical, Professional, Ethical, Legal Aspects in Counseling ... 3
- 3. **Life Styles and Career Development (One Course Required)**
EDC 525 Independent Research: Community Resources .. 3
(Elective but not required for Social Agency II)
EDC 529 Psychology of Life Styles and Career Decision Making 3
(Required for Social Agency II)
- 4. **Counseling Theories and Techniques (Required)**
EDC 543 Theories and Techniques of Counseling 4

- 5. **Group Dynamics, Processing, Counseling (Required)**
EDC 583 Theories and Techniques of Group Counseling 4
Prerequisite: EDC 543

- 6. **Research, Statistics, Proposal Writing, Evaluation (One Course Required)**
EDT 503 Educational Research Methodology 4

- EDA 513 Evaluation of Educational and Organizational Systems 4

- 7. **Supervised Practicum (One Course Required)**
EDC 545 Practicum: Counseling Techniques 5
Prerequisite: Second last course to be taken for the degree.

- 8. **Field Experience (One Course Required)**
EDC 598 Field Experiences in Social Agencies 4
Prerequisite: Last course to be taken for the degree.

MASTER'S DEGREE ENHANCEMENT

(Upgrading a 45 quarter hour master's degree in counseling to meet educational requirements for Ohio Licensure in Professional Counseling)

In effect, the student takes all other additional required courses for the Social Agency II program that have not already been taken as part of Social Agency I. Usually the 15 hours are taken from the following required areas.

General Requirements
15 quarter hours
Preparation for State Licensure Exam

In some cases, individuals may need to take more than 15 additional hours to meet the requirements, depending on the electives they may have taken in the Social Agency I program.

Recommended Sequence of Courses

- 1. **Human Development (One Course required)**
EDC 530 Psychology of Individual Differences 4
(If not yet successfully completed)
EDC 531 Psychology of Personality Development 3
(If not yet successfully completed)

- 2. **Life Style and Career Development (Required)**
 **EDC 529 Psychology of Life Styles and Career Decision Making 3
- 3. **Appraisal of the Individual (Two Required)**
 **EDC 537 Diagnosis and Treatment Planning in Counseling 3 (Required)
 **EDC 533 Psychometrics 3
 OR
 **EDC 535 Test Interpretations & Case Studies 3
- 4. **Foundations of Professional Responsibilities, Ethics & Legal Aspects**
 **EDC 544 Philosophical, Professional, Ethical, Legal Aspects in Counseling 3
- 5. **Supervised Practicum (Required)**
 *EDC 584 Practicum: Group Counseling 4
 Prerequisite: EDC 583, EDC 545
- 6. **Culminating Seminar (Required)**
 **EDC 600 Preparation for State Exam (LPC) 2
 (Course must be taken in student's last term)

*Requires admission to the Graduate School.
 **Requires admission to the Graduate School or a master's degree in Counseling or a license in Counseling.

EDC 537, 544, and 584 ARE AVAILABLE AT THE DAYTON AND CAPITAL CENTERS ONLY.

MASTER'S ENHANCEMENT PROGRAM NOTES

- 1. Students wishing to complete the enhancement package must be admitted to the Graduate School.
- 2. Students who have received the forty-five quarter hour degree in Counseling or the Social Agency Counseling I degree from the University of Dayton will usually need the Enhancement Program as

described. It is designed to allow the student to meet both the required number of hours and the specific course area requirements for Ohio Licensure in Professional Counseling. Students holding a master's degree in counseling which required more than forty-five but less than sixty quarter hours and those who received a master's degree in counseling from another university may need a different number of total quarter hours and a unique course selection to complete the educational requirements for Ohio Licensure in Professional Counseling.

SOCIAL AGENCY COUNSELING II

(Leading to Ohio Licensure in Professional Counseling; L.P.C.)

General Requirements
 60 quarter hours
 Report, Field Experiences, EDC 598
 Exit Examination in EDC 600

Recommended Sequence of Courses

Quarter Hours

- 1. **Human Development (Required)**
 EDC 531 Psychology of Personality Development 3
- 2. **Social and Cultural Foundations of Counseling (Required)**
 EDC 530 Psychology of Individual Differences 4
- 3. **Foundations of Professional Responsibilities, Ethical and Legal Aspects**
 EDC 544 Philosophical, Professional, Ethical, Legal Aspects in Counseling 3
- 4. **Appraisal of the Individual (Two Courses Required)**
 EDC 537 Diagnosis and Treatment Planning in Counseling 3 (Required)
 EDC 533 Psychometrics 3
 OR
 EDC 535 Test Interpretations and Case Studies 3

- 5. **Life Style and Career Development (Required)**
 EDC 529 Psychology of Life Styles and Career Decision Making 3
- 6. **Counseling Theories and Techniques (Required)**
 EDC 543 Theories and Techniques of Counseling 4
- 7. **Group Dynamics, Processing, Counseling (Required)**
 EDC 583 Theories and Techniques of Group Counseling 4
 Prerequisite: EDC 543
- 8. **Research and Evaluation (One Course Required)**
 EDA 513 Evaluation of Educational and Organizational Systems 4
 OR
 EDT 503 Educational Research Methodology 4
 Prerequisite: EDC 529, 533, or 535, 543, 583
- 9. **Supervised Practica (Required)**
 EDC 545 Practicum: Counseling Techniques 5
 (Fourth last course to be taken for the degree)
 # EDC 584 Practicum: Group Counseling 4
 Prerequisite: EDC 583, 545
- 10. **Field Experiences (Required)**
 EDC 598 Field Experiences in Social Agencies 4
 (Course must be taken in the student's last term)
- 11. **Culminating Seminar (Required)**
 EDC 600 Preparation for State Exam (LPC) 2

#Indicates course available only at the Dayton and Capital Centers

Electives—May Be Taken From the Remaining EDC Courses Above or From the Courses Listed Below

- EDC 524 Educational and Occupational Information in Counseling 3
- EDC 525 Independent Research: Community Resources .. 3
- EDC 528 Career Education 3
- EDC 532 Psychology of Learning Disabilities and Other Exceptionalities 4

EDC 534 Individual Psychological Evaluation of Exceptional Children 3

EDC 574 Independent Study in Personnel Services 1-6

EDC 581 Techniques of Child Counseling 3

EDC 635 Marriage and Family Counseling 4

EDC 573 Multicultural Counseling 3

EDC 602 Counseling Seminars 1-3

To obtain the License in Professional Counseling, the student must:

1. Fulfill all requirements for the master's degree in counseling.
2. Meet the requirements for supervised experience in counseling as required by the State of Ohio Counselor and Social Worker Board.
3. Pass the competency exam required by the Ohio Counselor and Social Worker Board.

CLINICAL COUNSELING
(Leading to Ohio Licensure, L.P.C.C.)

General Requirements
30 quarter hours
Internship

Recommended Sequence of Courses

1. **Clinical Psychopathology, Personality, and Abnormal Behavior (Required)**
*EDC 623 Foundations of Clinical Counseling .. 4
2. **Evaluation of Mental and Emotional Status (Required)**
*EDC 630 Evaluation of Mental and Emotional Condition 4
3. **Diagnosis of Mental and Emotional Disorders (Required)**
**EDC 631 Diagnosis of Mental and Emotional Disorders 4
4. **Methods of Intervention and Prevention of Mental and Emotional Disorders (Required)**

*EDC 680 Theories of Clinical Counseling 4

5. **Treatment of Mental and Emotional Disorders (Required)**

*EDC 683 Treatment of Mental and Emotional Disorders 4

6. **Internship (Required)**

*EDC 690 Internship in Clinical Counseling 6

7. **Electives: (One Course Required)**

**EDC 681 Integrative Approach to Clinical Counseling 4

**EDC 682 Counseling Marital and Family Conflict . 4

**EDC 684 Special Problems in Treating the Severely Mentally Disabled 4

**EDC 685 Special Problems in Treating the Severely Emotionally Disturbed Child 4

THESE COURSES ARE AVAILABLE ONLY AT THE DAYTON AND CAPITAL CENTERS.

*Requires admission to the Graduate School
**Requires admission to the Graduate School or a master's degree in Counseling or licensure as a counselor or current employment in a counseling setting, or written permission from a faculty member of the Clinical Counseling Program.

CLINICAL COUNSELING PROGRAM NOTES

1. Students wishing to enter the Clinical Counseling Program must:
 - a. be admitted to the Graduate School.
 - b. be working on or have completed a master's degree in counseling and have maintained at least a 3.25 (based on 4.0) grade point average in all graduate course work.
 - c. have attained a score of 50 on the "Miller Analogies Test" or attain

a score of 1000 on the Graduate Record Examination, as specified by the Ohio Board of Counseling and Social Work.

- d. demonstrate the personal qualities and insight appropriate for the role of Clinical Counselor. A student who is accepted may be advised to seek personal counseling to enhance his or her own ability to counsel others.
- e. write a biographic description explaining the decision to prepare for the licensure exam in professional clinical counseling.
- f. participate in an interview screening session, including a written response section and a face-to-face session with a panel of faculty members.

2. Students successfully completing the program in Clinical Counseling will receive a certificate of participation.

MASTER'S DEGREE AND OHIO CERTIFICATION IN SCHOOL PSYCHOLOGY

Quarter Hours

- I. **Psychological Foundations (25 hours)**
 - A. **Cultural Divers. and Human Excep. (2 courses req.)**

EDT 591 Mainstreamed Handicapped Students AND ... 4

+EDC 530 Psychology of Individual Differences +4
 - B. **Human Learning (1 course req.)**

EDT 501 Learning Theory and Education 4
 - C. **Norm. & Abnorm. Child & Adoles. Devel. (2 courses req.)**

EDT 504 Human Development & Education AND 4

EDC 531 Psych. of Personality and Development 3

- D. Biological Bases of Behavior** (1 course req.)
+EDC 571 Foundations of Neuropsychology +3
- E. Social and Emotional Bases of Behavior** (1 course req.)
+EDC 537 Diagnosis & Treatment Planning in Counseling +3
- II. Educational Foundations** (8 to 17 hours)
- F. Educational Philosophy** (1 course req.)
EDT 502 Philosophical Studies in Education 4
- G. Curriculum and Instructional Techniques** (1 course req.)
++EDA 511 Curriculum ... ++4
- H. Education of Exceptional Learners** (1 course req.)
EDT 593 Educ. of Stud. with Lrng. & Beh. Disord. 4
(Prereq.: See advisor.)
- I. Organization and Operation of Schools** (1 course req.)
++EDC 539 Administration of Pupil Personnel Services ++3
- J. Field Based Experiences** (1 course req.)
++EDC 573 Orientation to the Educational Process ++2
- III. Assessment and Intervention** (47 hours)
- K. Diag. & Remed. of Basic Acad. Areas** (2 courses req.)
EDT 581 Assessment of the Special Needs Learner AND 4
EDT 594 Diagnostic Teaching in SLD 4
- L. Psychoeducational Assessment** (3 courses req.)
EDC 577 Ind. Beh. & Personality Assmt. AND 4
+EDC 576 Individual Cognitive Assessment AND +4
- +EDC 534 Ind. Psych. Eval. of Excep. Child +4
- M. Behavior Management** (1 course req.)
EDT 596 Classroom Structure & Beh. Mgmt. OR 4
(Prereq.: See advisor.)
EDT 584 Advanced Behavior Management 3
(Prereq.: See advisor.)
- N. Consultation and Interview Techniques** (1 course req.)
+EDC 578 Consultation in the Schools +4
- O. Counseling Theory and Practice** (3 courses req.)
EDC 543 Counseling Theories and Techniques AND 4
EDC 583 Theor. & Techniq. of Group Couns. AND 4
(Prereq.: EDC 543)
EDC 545 Practicum: Counseling Techniques 5
(Prereq.: EDC 543)
- P. Practicum** (4 course req.)
+EDC 579 Pract.: Ind. Assmnt. & Intervention 4
(Taken across 4 terms.)
- IV. Statistics & Research Design** (8 hours)
- Q. Statistics** (1 course req.)
EDT 638 Educational Statistics 4
- R. Research Design** (1 course req.)
EDT 503 Educational Research Methodology OR 4
EDA 513 Evaluation of Educational Systems 4
- V. School Psychology Foundations** (4 hours)
- S. History of School Psychology**
- T. Ethical & Professional Standards in Sch. Psych.**
- U. Role & Function of the School Psychologist**
- V. Legal Requirements in School Psychology**
EDC 572 Role & Function of the School Psych. 4
- VI. Internship** (12 hours)
- W. Internships**
+EDC 594 Internship in School Psychology +6
+EDC 595 Internship in School Psychology +6
- Total hours required for M.S. Degree 64
Total hours required for completion of School Psychology Program and for Ohio school psychology certificate 104
- + Indicates additional courses (40 hours) required beyond the master's degree to complete the school psychology program and to obtain Ohio's provisional certificate in school psychology.
++ Indicates additional courses (9 hours) required for students who do not have teaching certification. (See program notes #2 and #3, below.)
- SCHOOL PSYCHOLOGY PROGRAM NOTES**
- In addition to the admission criteria described elsewhere (positive references and undergraduate point average of at least 2.75), applicants will be required to take either the Miller Analogies Test (MAT) or the Graduate Record Examination (GRE), to submit a typewritten statement of their interest in and current perception of the role of the school psychologist, and to participate in interviews with department faculty.
 - To be accepted into the school psychology program, students must (a) possess a valid Ohio teaching certificate, or (b) possess a degree in psychology or another mental health related major AND have completed at least two years of successful full-

time employment serving clients in a mental health setting.

3. Applicants who do not possess either of the above credentials must first obtain an Ohio provisional teaching certificate in learning disabilities before matriculating through the school psychology program.
4. All school psychology students must meet a residency requirement by enrolling in full-time coursework (12 or more hours) either for two consecutive terms (e.g., fall and winter, or winter and summer) or for two consecutive summer terms (e.g., summers of 1994 and 1995) between which the student is also enrolled in course work for both the fall and winter terms.
5. To obtain the Ohio certificate in school psychology, students must also take the NTE speciality test #40 (school psychologist), administered three times each year by ETS, and achieve Ohio's passing score. This test is normally taken in March of the internship year.
6. This program has been developed in accordance with the 1984 training standards adopted by the National Association of School Psychologists (NASP) and the 1987 Ohio certification standards. In accordance with NASP standards, this program requires the equivalent of at least three years of full-time graduate study, including at least 90 graduate quarter hours and including at least one academic year of supervised internship. The program excludes credit for undergraduate study.

COURSES OF INSTRUCTION

EDC 522. INTRODUCTION TO GUIDANCE: Concepts and techniques for teachers and counselors discussed within the framework of the essential guidance services. Emphasis on developmental approach; roles and responsibilities of personnel; cross-cultural counseling; consulting with parents, teachers, and administrators; procedures for case study; referrals; ethical and legal aspects; issues and trends. *3 qtr. hrs.*

EDC 523. DELINQUENTS AND JUVENILE COURT: Examines students at risk of juvenile deviance, the juvenile court system, and underlying ideologies and current debates concerning treatment and/or punishment decisions. *2 qtr. hrs.*

EDC 524. EDUCATIONAL AND OCCUPATIONAL INFORMATION: Selection, utilization, and evaluation of educational and occupational information materials; familiarization with standard labor market data, current requirements for admission into college, and available sources of placement information. *3 qtr. hrs.*

EDC 525. INDEPENDENT RESEARCH: COMMUNITY RESOURCES: Familiarization with availability of services in appraisal, guidance; local information and placement (medical, pastoral, social welfare, mental, educational, industrial, labor, commercial, governmental, and recreational agencies). *3 qtr. hrs.*

EDC 528. CAREER EDUCATION: Assistance for teachers, counselors, administrators and social agency personnel in improving their career education functions through a coordinated and concentrated effort of occupational guidance integrated within the total curriculum. *3 qtr. hrs.*

EDC 529. PSYCHOLOGY OF LIFE STYLE AND CAREER DECISION-MAKING: Designed to provide the student with knowledge, skills, attitudes, and values related to a variety of life styles and the process of career decision-making. *3 qtr. hrs.*

EDC 530. PSYCHOLOGY OF INDIVIDUAL DIFFERENCES: Nature, extent, and significance of variability; hereditary and cultural influences; theories of intelligence; trait organization; group differences. *4 qtr. hrs.*

EDC 531. PSYCHOLOGY OF PERSONALITY DEVELOPMENT: Personality theory and abnormal psychology are discussed with emphasis on dynamics of personal behavior. *3 qtr. hrs.*

EDC 532. PSYCHOLOGY OF LEARNING DISABILITIES & OTHER EXCEPTIONALITIES: Designed to provide an overview of the range of handicapping conditions for which educational program standard have been developed. Emphasis is given to the cognitive and affective impact upon the individual and family. *4 qtr. hrs.*

EDC 533. PSYCHOMETRICS: Lectures and demonstrations in the principles and application of psychological measurement, with emphasis on standardized group tests of intelligence and scholastic achievement, interest tests, personality tests, etc. *3 qtr. hrs.*

EDC 534 INDIVIDUAL PSYCHOLOGICAL EVALUATION OF EXCEPTIONAL CHILDREN: Insight into the effective evaluation of special needs individuals. The school psychology student will be exposed to the many areas of testing required to complete a non-discriminatory and multi-factored assessment and learn specific diagnostic and prescriptive techniques. *4 qtr. hrs.*

EDC 535. TEST INTERPRETATIONS AND CASE STUDIES: Experience and lecture in case studies: constituents of study; philosophy; criteria for collecting data; observation techniques, analysis through group role devices, client-participatory non-test assessment techniques, tests; principles of writing, evaluative criteria. In testing: test concepts, statistics, analysis, uses, communication, ethics. *3 qtr. hrs.*

EDC 537. DIAGNOSIS AND TREATMENT PLANNING IN COUNSELING: Techniques that assess an individual's condition and developing an appropriate counseling approach to the situation. *3 qtr. hrs.*

EDC 539. ADMINISTRATION OF PUPIL PERSONNEL SERVICES: The effective planning, developing, and administering of a totally balanced and co-ordinated program of pupil personnel services. *3 qtr. hrs.*

EDC 543. COUNSELING THEORIES AND TECHNIQUES: Development of

skills in counseling through an analysis of various approaches to the behavior change process. An integrated approach for modifying the behavior of children and adults. *4 qtr. hrs.*

EDC 544. PHILOSOPHICAL, PROFESSIONAL, ETHICAL & LEGAL ASPECTS OF COUNSELING: Study of the philosophical assumptions of the various theories of counseling and psychotherapy. Treatment of counseling ethics and professional practices; laws and court decisions pertaining to counseling. *3 qtr. hrs.*

EDC 545. PRACTICUM: COUNSELING TECHNIQUES: Supervised experience in counseling. Both group and individualized instruction and supervision. Last course for master's degree. *5 qtr. hrs.*

EDC 551. INDEPENDENT READINGS & FIELD WORK IN COLLEGE STUDENT PERSONNEL SERVICES: A study of personnel services in higher education; theory and practice of administration, trends, and research. *3 qtr. hrs.*

EDC 552. RESEARCH: COLLEGE STUDENT PERSONNEL SERVICES ISSUES: Problems encountered during the internship and present-day problems of campus life. *2 qtr. hrs.*

EDC 553. INTERNSHIP IN COLLEGE PERSONNEL SERVICES: A three-trimester experience in three college personnel services under the instruction and supervision of staff members of the same services working closely with the coordinator of College Personnel Work. Given in blocks of 3 quarter hours each over three terms. *9 qtr. hrs.*

EDC 571. FOUNDATIONS OF NEUROPSYCHOLOGY: Normal and abnormal neuropsychological development, with a focus on functional systems. Basic neuroanatomy. Special neurological pathologies in children and their impact on learning. Theory, status, research and clinical applications. Screening and referral decision. Implications for instruction, treatment and rehabilitation. *3 qtr. hrs.*

EDC 572. ROLE AND FUNCTION OF SCHOOL PSYCHOLOGIST: Topics of significance in the profession of school psychology, with emphasis on history and foundations of school psychology, legal and ethical issues, professional issues and standards, and roles and functions of the school psychologist. Research paper required. *2 qtr. hrs. in each of two terms.*

4 qtr. hrs.

EDC 573. ORIENTATION TO THE EDUCATIONAL PROCESS: Directed observation of and participation in the normal school process under supervision within the school. Required of all school psychology candidates who do not have teaching certificates or at least two years of successful full-time employment serving clients in a human service agency. *2-6 qtr. hrs.*

EDC 574. INDEPENDENT STUDIES IN PERSONNEL SERVICES: Independent study undertaken with permission of the chair. *1-6 qtr. hrs.*

EDC 576. INDIVIDUAL COGNITIVE ASSESSMENT: Evaluation and interpretation of intelligence tests. Intensive experience in administering the Wechsler tests, Stanford-Binet test, and other appropriate cognitive tests used in multi-factor assessment according to Public Law 94-142 and House Bill 455. (Course limited to those students in Psychology programs.) *4 qtr. hrs.*

EDC 577. INDIVIDUAL BEHAVIORAL AND PERSONALITY ASSESSMENT Introduction of the Psychology student to the process of multifactor evaluation. The assessment focus will be on the pre-referral process and collection of behavioral data. *4 qtr. hrs.*

EDC 578. CONSULTATION IN THE SCHOOLS: The role of the consultant in a school setting is examined with emphasis on acquiring effective consultation skills. A school based problem solving model is presented that requires development of appropriate consultant skills. *3-4 qtr. hrs.*

EDC 579. PRACTICUM: INDIVIDUAL ASSESSMENT AND INTERVENTION: Assessment and intervention experiences, supportive of tests learned in EDC 576, 534, and 577, and of interventions learned in 596, and of consultation skills learned in EDC 578, carried out in schools under the supervision of school psychologists. *3 qtr. hrs.*

EDC 580. GUIDANCE IN THE ELEMENTARY SCHOOL: A knowledge base of essential guidance services provided in the elementary school setting. Identification of at-risk students, theories in responding to elementary student needs, basic guidance services, and cross-cultural counseling. *3 qtr. hrs.*

EDC 581. TECHNIQUES OF CHILD COUNSELING: Focus on practical counseling, consulting and intervention techniques for specific developmental, social or behavior problems children experience. Suggestions for counseling children who are "exceptional" or experiencing special concerns resulting from societal problems. *3 qtr. hrs.*

EDC 583. THEORIES AND TECHNIQUES OF GROUP COUNSELING: This course has two purposes: to enable the counselor to work effectively with groups; and to achieve deeper counselor self-understanding, through participation in the group process. (One half of class time is devoted to lecture and one half to participation.) *4 qtr. hrs.*

EDC 584. PRACTICUM: GROUP COUNSELING: Supervised practice and observation in group counseling techniques. *4 qtr. hrs.*

EDC 594-595. INTERNSHIP FOR SCHOOL PSYCHOLOGISTS: A job-related program for nine months under the immediate supervision of a trained school psychologist. The intern will receive a stipend, made available from State of Ohio Foundation funds. *12 qtr. hrs.*

EDC 597. PLANNED FIELD PROJECT: A school and university supervised culminating activity in which graduate students will demonstrate ability to synthesize the major

understandings of the program and demonstrate skills in providing effective interventions for a student or students whom the graduate student has previously identified as being "at risk." Project: case study, interventions and outcome, self evaluation. *4 qtr. hrs.*

EDC 598. FIELD EXPERIENCE IN SOCIAL AGENCIES: Directed experience in professional functions within cooperating social agencies in the community. *4 qtr. hrs.*

EDC 599. FIELD EXPERIENCES IN PERSONNEL SERVICES: Extensive directed experience in professional functions within new kinds of cooperating schools and community organizations. May be taken three times. Prerequisite: permission, department chair. *4 qtr. hrs.*

EDC 600. PREPARATION FOR STATE EXAM: A summary emphasis of the content in each of the areas covered in the master degree program. Designed to prepare the student for the State of Ohio School Counselor Certification Exam or Licensed Professional Counselor Exam. *2 qtr. hrs.*

EDC 602. COUNSELING SEMINAR: The goal of the Counseling Seminar is to assist graduate students in gaining knowledge and increased skills within the Counseling, Guidance, and Program Administration Core within the Teacher Education and Certification Standards for a school counselor by the State of Ohio. *1-6 qtr. hrs.*

EDC 623. FOUNDATIONS OF CLINICAL COUNSELING: Description of the specific aspects of personality theory that lead to an understanding of abnormal behavior and psychopathology as it affects a wide range of individuals from children through the aged. The relevance of these concepts and theories to clinical counseling is explored. *4 qtr. hrs.*

EDC 630. EVALUATION OF EMOTIONAL AND MENTAL CONDITION: Methods of administering and interpreting individual and group standardized tests of mental ability, interest, aptitude, personality, and achievement. *4 qtr. hrs.*

EDC 631. DIAGNOSIS OF EMOTIONAL AND MENTAL DISORDERS: Presentation of the mental status exam and other means of developing a diagnosis as described in the current edition of the "Diagnostic and Statistical Manual for Mental Disorders." Special problems including mental retardation, psychosexual disorders, substance abuse, and addiction are addressed. *4 qtr. hrs.*

EDC 635. MARRIAGE AND FAMILY COUNSELING: Designed to introduce students to perspectives of the marital relationship, the dynamics of adjustment and discord, theories and techniques of marriage counseling, and professional and legal issues. Special focus on family sculpturing and skill development through the utilization of simulations and role-playing demonstrations. *4 qtr. hrs.*

EDC 653. FIELD EXPERIENCES IN SCHOOL SOCIAL WORK: Extensive directed experience in professional functions within new kinds of cooperating schools. Prerequisite: permission of department chair. *5 qtr. hrs.*

EDC 655. CAREER GUIDANCE INSTITUTE: Designed to assist counselors, teachers, and administrators in implementing an effective Career Guidance Program within their respective schools. *3 qtr. hrs.*

EDC 673. COUNSELING MULTIETHNIC POPULATIONS: DOMESTIC AND GLOBAL: Designed to develop sensitivity and awareness in human diversity; introduce multicultural concepts, competencies, and research; and provide an experiential component. *3 qtr. hrs.*

EDC 680. THEORIES OF CLINICAL COUNSELING: Wide scope of psychological and educational methods of prevention and intervention used in treating mental illness. Includes techniques used with a wide range of populations and conditions. *4 qtr. hrs.*

EDC 681. INTEGRATIVE APPROACH TO CLINICAL COUNSELING: Assistance for students in selecting that theory or those aspects of various theories of

clinical counseling that best characterize theory approach to clients. Emphasis is on the integration of various techniques with theories and each other and with the counselor's personal characteristics. *4 qtr. hrs.*

EDC 682. COUNSELING MARITAL AND FAMILY CONFLICT: Theories and techniques used in intervention in serious crisis situations, such as family violence, child abuse, and other related matters. *4 qtr. hrs.*

EDC 683. TREATMENT OF MENTAL AND EMOTIONAL DISORDERS: Presentation of methods utilized in treatment and management of mental disorders including counseling techniques, record keeping, and referral procedures, and use of psychotropic medication. *4 qtr. hrs.*

EDC 684. TREATMENT OF SEVERELY MENTALLY DISTURBED ADULTS: Unique needs of the severely emotionally disabled person including the chronic schizophrenic population and a wide spectrum of treatment modalities. *4 qtr. hrs.*

EDC 685. TREATMENT OF SEVERELY EMOTIONALLY DISTURBED CHILD: Unique needs of the severely emotionally disabled child including systems approach to treatment. *4 qtr. hrs.*

EDC 690. INTERNSHIP IN CLINICAL COUNSELING: Supervised experience in a field placement setting that specializes in the evaluation and treatment of persons with emotional and mental disorders. *6 qtr. hrs.*

EDC 801. INTERPERSONAL DYNAMICS: INDIVIDUAL AND ORGANIZATIONAL: This course aims to improve a student's ability to communicate effectively. The student will learn that an effective organization is a group of people working together toward its objectives. The more each member and leader are aware of interaction patterns in the organization, the more effectively each influences it. *3 qtr. hrs.*

Department of
**EDUCATIONAL
ADMINISTRATION
(EDA)**

William R. Drury,
Chair of the Department

It is the primary mission of the Department of Educational Administration to prepare individuals to be educators and scholar-practitioners who will understand and be able to implement a leadership role. The department is committed to productive scholarship, effective teaching, disciplined inquiry, collaborative learning, and the acceptance, in an academic sense, of divergent views.

The Department of Educational Administration is committed to providing quality instruction and support to individuals who 1) have demonstrated leadership potential within an educational setting and have expressed interest in pursuing a master's degree in educational leadership, or 2) hold a master's degree and wish to pursue a specific administrative certification program, or 3) are interested in earning the Educational Specialist's degree or the Ph.D., or 4) wish to improve their educational leadership knowledge and skills.

**ADMISSION
REQUIREMENTS**

(See School of Education requirements)

Advisor

Upon acceptance into the program, the student will be assigned a faculty advisor who will be available to help develop a course of study to meet the individual needs of the student.

DEGREE REQUIREMENTS

To earn a Master of Science in Education Degree in Educational Leadership the student is required to complete a minimum of 45 quarter hours, achieving a grade point average

of 3.0 or better. The following courses are included in the required 45 quarter hours:

EDA 505	Educational Leadership . 4
EDA 506	School Administration .. 4
EDA 509	Supervision.. 4
EDA 513	Evaluation of Educational & Organizational Systems 4
EDA 511	Curriculum 4
EDA 510	Instructional Leadership.. 4
EDT 502	Philosophical Studies in Education 4
EDC 530	Psychology of Individual Differences 4
EDA 515	School Law I. 3
EDA 508	Computers in Educational Leadership 3
EDA 507	Planned Field Experience I 4
EDA 519	Independent Learning . . 3

**DEPARTMENTAL
CONFERENCE**

Upon completion of course work for the master's degree program, the student will be sent a list of questions to be answered and returned to the department prior to the departmental conference. All students are required to participate in a departmental conference in the term of graduation and to complete a program evaluation.

**SUPERVISOR'S
CERTIFICATE WITHIN
THE MASTER'S DEGREE**

A student may apply for a supervisor's certificate upon completing the course work required for the master's degree in Educational Leadership and providing evidence of 27 months of successful teaching experience under a standard certificate. Application for the certificate should be made through the School of Education, Office of the Assistant Dean.

**ELEMENTARY SCHOOL
PRINCIPAL'S CERTIFICATE**

A total of 68 quarter hours is required to obtain an elementary school principal's certificate. If 45 of the

hours have been completed through the master's degree program, an additional 23 quarter hours will be needed to fulfill the requirements for a principal's certificate.

The 23 quarter hours of post-master's coursework required for the elementary school principal's certificate are listed below:

EDA 604	Elementary School Administration 3
EDA 610	Curriculum Development & Leadership 3
EDA 621	Public Relations/Policy Development 3
EDA 615	School Law II 3
EDA 617	School Finance & Economics 4
EDA 626	Staff Personnel Services 4
EDA 607	Planned Field Experience II 3

Also required is evidence of 27 months of satisfactory teaching experience of which at least 18 months shall have been in grades K-8 under a standard teaching certificate or under a standard special teaching certificate.

**SECONDARY SCHOOL
PRINCIPAL'S CERTIFICATE**

A total of 68 quarter hours is required to obtain a secondary school principal's certificate. If 45 of the hours have been completed through the master's degree program, an additional 23 quarter hours will be needed to fulfill the requirements for a principal's certificate.

The 23 quarter hours of post-master's course work required for the secondary school principal's certificate are listed below:

EDA 605	Secondary School Administration 3
EDA 610	Curriculum Development & Leadership 3
EDA 621	Public Relations/Policy Development 3
EDA 615	School Law II 3
EDA 617	School Finance & Economics 4
EDA 626	Staff Personnel Services 4
EDA 607	Planned Field Experience II 3

Also required is evidence of 27 months of satisfactory teaching experience of which at least 18 months shall have been in grades 7-12 under a standard high school teaching certificate or under a standard special teaching certificate .

EDUCATIONAL ADMINISTRATIVE SPECIALIST CERTIFICATE

The Educational Administrative Specialist certificate may be earned with a total of 68 quarter hours issued in the following areas of specialization:

- 1) Business Management
- 2) Educational Research
- 3) Educational Staff Personnel Administration
- 4) Instructional Services
- 5) Pupil Personnel Administration
- 6) School and Community Relations
- 7) Special Education (Exceptional Children)

For information concerning this type of certificate, contact the Department of Educational Administration at (513) 229-3737.

ASSISTANT SUPERINTENDENT'S CERTIFICATE

A total of 75 quarter hours is required to obtain an assistant superintendent's certificate. If 45 of the hours have been completed through the master's degree program, an additional 30 quarter hours will be needed to fulfill the requirements for an assistant superintendent's certificate.

The 30 quarter hours of post-master's coursework required for the assistant superintendent's certificate are listed below:

EDA 604	Elementary School Administration	3
EDA 605	Secondary School Administration	3
EDA 610	Curriculum Development & Leadership	3
EDA 621	Public Relations/Policy Development	3
EDA 615	School Law II	3

EDA 617	School Finance & Economics	4
EDA 626	Staff Personnel Services..	4
EDA 607	Planned Field Experience II	3
EDA 716	Business Affairs & Physical Resources	4

Also required is evidence of 27 months of satisfactory experience in a teaching, supervisory or administrative position under the appropriate certificate.

SUPERINTENDENT'S CERTIFICATE

A total of 90 quarter hours is required to obtain a superintendent's certificate. If 45 of the hours have been completed through the master's degree program, an additional 45 quarter hours will be needed to fulfill certification requirements.

The 45 quarter hours of post-master's course work required for superintendent certification are as follows:

EDA 604	Elementary School Administration	3
EDA 605	Secondary School Administration	3
EDA 610	Curriculum Development & Leadership	3
EDA 621	Public Relations/Policy Development	3
EDA 615	School Law II	3
EDA 617	School Finance & Economics	4
EDA 626	Staff Personnel Services..	4
EDA 607	Planned Field Experience II..	3
EDA 716	Business Affairs & Physical Resources	4
EDA 718	The Superintendency . . .	4
EDA 719	Human Relations in Educational Leadership .	4
EDA 710	Curriculum Evaluation & Instruction	3
EDA 722	Collective Bargaining & Contract Management ...	4

Also required is evidence of 27 months of satisfactory experience in an

administrative or supervisory position under the appropriate certificate.

COURSES OF INSTRUCTION

EDA 505. EDUCATIONAL LEADERSHIP: The focus of this course is leadership within schools and the role of the leader in maintaining and/or bringing about change within the school building, department or other educational unit. *4 qtr. hrs.*

EDA 506. SCHOOL ADMINISTRATION: This survey course in school administration focuses upon the history and philosophies of administration, theories of administration, the school governance system, and major administrative task areas. *4 qtr. hrs.*

EDA 507. PLANNED FIELD EXPERIENCE I: This course provides opportunities for the student to experience supervisory responsibilities. Emphasis is placed on practicing the skills learned in the master's program, receiving feedback on efforts, and relating practice to theory. *4 qtr. hrs.*

EDA 508. COMPUTERS IN EDUCATIONAL LEADERSHIP: This course focuses on understanding the uses of the computer for instructional and management purposes. Emphasis is placed on planning for instruction, evaluating software and hardware, record keeping, projecting costs, etc. *3 qtr. hrs.*

EDA 509. SUPERVISION: This course is designed to explore supervision concepts and skills essential to providing leadership in the improvement of teaching and learning. Emphasis is placed on the means of providing leadership in supervisory task areas. *4 qtr. hrs.*

EDA 510. INSTRUCTIONAL LEADERSHIP: This course develops the skills and attitudes essential to helping others refine their instructional effectiveness. Emphasis is placed on helping teachers use alternative models of teaching (reading and math emphasized), prescribing appropriate learning approaches, and using classroom observation data. *4 qtr. hrs.*

EDA 511 CURRICULUM: This course develops an understanding of the history, purposes, and practices of the elementary/secondary school with emphasis upon materials and practices which have been found effective.
4 qtr. hrs.

EDA 513. EVALUATION OF EDUCATIONAL & ORGANIZATIONAL SYSTEMS: This course is designed to develop knowledge and skills necessary for researching program effectiveness with emphasis placed on delineating, collecting, analyzing, and applying descriptive and judgmental information for the purpose of decision-making.
4 qtr. hrs.

EDA 515. SCHOOL LAW I: This course addresses legal issues pertinent to teacher, administrator, and student legal rights and responsibilities in daily school happenings. The legal process, structures of the law, legislation/litigation, and practices to avoid legal infringements are addressed. Primary emphasis is on building level activities.
3 qtr. hrs.

EDA 519. INDEPENDENT LEARNING: This course involves an in-depth project in the area of educational leadership. The activity may be research-based or may involve evaluation of a recently planned and implemented project within a school system or organization.
3 qtr. hrs.

EDA 604 ELEMENTARY SCHOOL ADMINISTRATION: POLICY & PRACTICE: This course places emphasis on the application of the administrative processes to the elementary school setting. Administering the day-to-day operation, and managing and evaluating the elementary school program are addressed.
3 qtr. hrs.

EDA 605. SECONDARY SCHOOL ADMINISTRATION: POLICY & PRACTICE: Emphasis is placed on the application of the administrative process as well as the research on school effectiveness to the secondary school setting. Focus includes administering the day-to-day operation, as well as managing and evaluating the secondary school program.
3 qtr. hrs.

EDA 607. PLANNED FIELD EXPERIENCE II: The planned field experience is intended to provide the participant an opportunity to relate the course work, research, simulation, and independent study in which he/she has engaged to actual problems encountered in administering the elementary or secondary school building/program.
3 qtr. hrs.

EDA 610. CURRICULUM LEADERSHIP: (See EDA 811). 3 qtr. hrs.

EDA 615. SCHOOL LAW II: (See EDA 815). 3 qtr. hrs.

EDA 617. SCHOOL FINANCE: (See EDA 817) 4 qtr. hrs.

EDA 621. PUBLIC RELATIONS AND POLITICS: (See EDA 821) 3 qtr. hrs.

EDA 626. STAFF PERSONNEL SERVICES: This course looks at the systematic selection, evaluation, assignment, and development of both professional and classified school personnel. Emphasis is placed on professional negotiations with an analysis of various negotiated agreements as they relate to the staff and to administration.
4 qtr. hrs.

EDA 708. COMPUTERS IN EDUCATIONAL LEADERSHIP (See EDA 508). 3 qtr. hrs.

EDA 710. CURRICULUM EVALUATION AND INSTRUCTION: (See EDA 810). 3 qtr. hrs.

EDA 716. BUSINESS AND FACILITIES MANAGEMENT: (See EDA 816). 4 qtr. hrs.

EDA 718. THE SUPERINTENDENCY: (See EDA 818). 4 qtr. hrs.

EDA 719. HUMAN RELATIONS IN EDUCATIONAL LEADERSHIP: (See EDA 819). 4 qtr. hrs.

EDA 722. COLLECTIVE BARGAINING: (See EDA 822). 4 qtr. hrs.

EDUCATIONAL SPECIALIST DEGREE IN EDUCATIONAL LEADERSHIP (EDL)

William R. Drury, Program Director

The Educational Specialist Degree is Offered Jointly by The Colleges of Education and The Graduate Schools of The University of Dayton and Wright State University

This Post-Master's Educational Specialist Degree, Ed.S., program is designed to enhance individual capabilities for educational leadership in the following roles: superintendent, assistant superintendent, director, supervisor, and principal. The areas of staff/organizational development, program development and evaluation, law/finance/facilities, public relations, research, and computers are included. Emphasis is given to preparing individuals for central office positions.

A planned program of study requires a minimum of 50 quarter hours of graduate work beyond the master's degree. Course work is offered in a sequential order so that all requirements can be completed in a two-year period. The program may be completed either at the University of Dayton or at Wright State University. Previous post-master's course work may be transferred into the program if it supports the objectives of the overall program.

ADMISSION REQUIREMENTS

1. Admission to the Graduate School.
2. A master's degree.
3. Three years of professional experience in teaching and/or administration.

4. Submission of 3 letters of recommendation.
5. Earned cumulative grade point average of 3.5 or better on the graduate level.
6. Acceptance by a committee of department members.

PROGRAM REQUIREMENTS

Quarter Hours

Core Courses 17

EDA 819	Human Relations	..... 4
EDA 810	Curriculum Evaluation & Instruction	..... 3
EDA 812	Program & Staff Development & Evaluation	.... 4
EDT 808	Ideas that Shape American Education	..... 3
EDT 803	Research	..... 3

Concentration Courses 28

EDA 818	The Superintendency	.... 4
EDA 811	Curriculum Leadership	. 3
EDA 708	Computers in Educational Leadership	..... 3
EDA 822	Collective Bargaining	... 4
EDA 821	Public Relations/Politics	3
EDA 817	School Finance	..... 4
EDA 816	Business & Facilities Management	..... 4
EDA 815	School Law	..... 3

Field-Based Experience 3

Research Project 2

COURSES OF INSTRUCTION

The following specialist degree courses are offered through the University of Dayton:

EDT 803. RESEARCH: The student considers practical applications and issues in research as they relate to educational leadership. It is assumed that all students have demonstrated competency in basic descriptive and inferential statistics. *3 qtr. hrs.*

EDA 807. RESEARCH PROJECT: Completion of the research project is an integral part of this degree program. Students earn two quarter hours of credit for the completion of their research project. This project will

relate to the individual's course work, interest, and work responsibilities. *2 qtr. hrs.*

EDT 808. IDEAS THAT SHAPE AMERICAN EDUCATION: This course addresses the ideas which have shaped American education. Particular emphasis will be placed upon the learner and the curriculum. Underlying these considerations and emphases is the assumption that history may be utilized as a policy science. *3 qtr. hrs.*

EDA 810. CURRICULUM EVALUATION AND INSTRUCTION: This course is designed to refine participant understanding of the realms of meaning, characteristics of effective programs, research findings on effective instruction, and curriculum management. *3 qtr. hrs.*

EDA 811. CURRICULUM DEVELOPMENT AND LEADERSHIP: This course is designed to develop the skills and abilities necessary to lead others in the curriculum development/refinement process. *3 qtr. hrs.*

EDA 812. PROGRAM & STAFF DEVELOPMENT: This course is designed to strengthen student competence with program development and evaluation processes. Major emphasis is focused on staff development planning, program implementation, and program assessment. *4 qtr. hrs.*

EDA 815. SCHOOL LAW II: This course addresses the statutes and judicial decisions which relate to schools and the responsibilities of boards of education, teachers, and administrators. Emphasis is placed on understanding the legal framework as it relates to providing quality education. *3 qtr. hrs.*

EDA 816. BUSINESS AND FACILITIES MANAGEMENT: In this course the student examines the fiscal operation of school districts from a business affairs point of view, as well as the proper use of the school district's physical resources. Energy conservation, facilities for the handicapped, and construction of new facilities are discussed. *4 qtr. hrs.*

EDA 817. SCHOOL FINANCE: This course presents guiding principles for developing adequate financial programs; the detailed study of sources of revenues, local, state, and federal; and the procedures in managing school funds with reference to budgeting, accounting, and auditing. *4 qtr. hrs.*

EDA 818. THE SUPERINTENDENCY: This course addresses the duties and responsibilities of central office administrators, especially those of the superintendent. Emphasis is placed on board of education relations, communication, and an analysis of the political structures within which the superintendent operates. *4 qtr. hrs.*

EDA 819. HUMAN RELATIONS IN EDUCATIONAL LEADERSHIP: This course focuses on improving the student's ability to communicate effectively in complex social systems. Emphasis is placed on group process, conflict management, values, and leader communication in an organization. *4 qtr. hrs.*

EDA 821. PUBLIC RELATIONS AND POLITICS: This course is designed to assist school administrators in refining their communication skills and political understandings. Provisions are made for the development of guidelines, techniques, and practices which facilitate wholesome relationships between school and community. *3 qtr. hrs.*

EDA 822. COLLECTIVE BARGAINING: This course provides students with a history of the development of collective bargaining, the procedures and techniques of collective bargaining and contract management, and the role and responsibilities of administrators in carrying out these functions. *4 qtr. hrs.*

EDA 833. PLANNED FIELD EXPERIENCE III: This experience is intended to provide the participant with an opportunity to relate the coursework, research, simulation, and independent study in which he/she has engaged to actual problems encountered in administration. *3 qtr. hrs.*

PH.D. IN EDUCATIONAL LEADERSHIP (DEL)

The Ph.D. Program in Educational Leadership is designed for individuals who have administrative experience in public or private elementary and secondary schools or in higher educational institutions. The program seeks particularly to prepare scholar-practitioners, that is, leaders who value both speculative and practical knowledge, deliberate with colleagues upon organizational purposes and the means for achieving them, work selflessly with others, and commit themselves to improving the quality of life within society.

For those specializing in the study of Catholic School leadership, the program seeks further to prepare leaders who understand Catholic school history and the implications of Church documents, commentaries, and social teachings for educational leadership.

ADMISSION REQUIREMENTS

1. Three years of successful administrative experience or documented evidence of educational leadership activities.
2. Master's degree (or equivalent)—the applicant may be required to complete certain prerequisites if the prerequisites were not included in the master's program.
3. A minimum 3.0 grade point average in a master's degree program.
4. Three letters of recommendation.
5. Acceptable performance on the Miller Analogies Test.

COURSEWORK

Formal coursework in the Ph.D. program is organized around the concepts of research, foundations, organizational behavior, school management, and personal-professional

growth. Coursework in an academic field outside of education is also required. Minimum requirements are as follows:

- Research—9 qtr. hrs.
- Dissertation—15 qtr. hrs.
- Foundations—15 qtr. hrs.
- Organizational Behavior—12 qtr. hrs.
- Personal-Professional Development—5 qtr. hrs.
- School Management—21 qtr. hrs.
- Cognate Area—16 qtr. hrs.

TOTAL: 93 quarter hours beyond the master's degree. The program includes the following coursework for those specializing in Catholic School Leadership:

- Catholic Education: An Analysis of Church Documents and Commentaries
- Catholic Schools: History and Future
- Effective Catholic Schools

A SUMMER PLUS RESIDENCY program option is available to students enrolled in the Ph.D. Program in Educational Leadership. This option allows students to complete a substantial portion of their coursework by taking two doctoral level courses each summer over a six-summer period. A student who begins a program in this manner is not obligated to complete program requirements under this option. He/she may follow any combination of a summer/fall/winter schedule until the period of residence.

Residency

The program embodies a full-time residency requirement of two consecutive trimesters on campus. The two terms may be August-May; May-December; or January-August.

Comprehensive Examination

In addition to completing coursework and residency requirements, students will successfully complete a comprehensive examination based on the contents of their coursework.

COURSES OF INSTRUCTION

EDA 901. RESEARCH I: BASIC EDUCATIONAL RESEARCH METHODOLOGY AND STATISTICS: Course is designed to provide an introduction to the methods and techniques used in quantitative research methodology. No previous research or statistical background is assumed. *3 qtr. hrs.*

EDA 902. RESEARCH II: EXPERIMENTAL DESIGN AND STATISTICS: Course is designed to extend the focus of Research I with particular emphasis on experimental design methodology and the use of computer programs in analyzing research data. *3 qtr. hrs.*

EDA 903. RESEARCH III: NON-EXPERIMENTAL MODES OF INQUIRY: Course emphasizes the design of studies and the issues faced by researchers using qualitative methods. Focus is on field work methods in educational settings; specifically observation, interviewing, collecting written documents, using questionnaires, and data reduction and analysis. *3 qtr. hrs.*

EDA 904. DISSERTATION: Course is designed to provide each Ph.D. candidate the opportunity to pursue, with faculty guidance and support, inquiry on a topic of personal significance which also offers promise of adding to the knowledge base of the profession. Prerequisite: Successful completion of comprehensive examination.

a minimum of 15 qtr. hrs.

EDA 911. THE STRUCTURE OF KNOWLEDGE: Prospective leaders will become familiar with intellectual issues in the realms of meaning so that they may lead their school faculties in examining curricular implications of these issues. *4 qtr. hrs.*

EDT 912. THE CULTURE OF THE SCHOOL: Examination of the school culture and an analysis of how social, political, and environmental influences affect student behavior and teacher and administrator practices. *4 qtr. hrs.*

EDT 913. HISTORY OF EDUCATIONAL ADMINISTRATION: A historical introduction to the development of educational administration as a profession; emphasis is placed on development of the knowledge base and its applicability to leaders who choose to be scholar-practitioners. *4 qtr. hrs.*

EDA 914. CATHOLIC EDUCATION: AN ANALYSIS OF CHURCH DOCUMENTS AND COMMENTARIES: Development of an understanding of the history, principles and issues of Catholic social teaching. *4 qtr. hrs.*

EDT 915. CATHOLIC SCHOOL: HISTORY AND FUTURE: Study of the history of United States Catholic schools, elementary through university, within the political, social, economic and religious context. *4 qtr. hrs.*

EDA 921. ORGANIZATIONAL BEHAVIOR IN EDUCATIONAL INSTITUTIONS: Development of organizational concepts that will help educational leaders become skilled organizational diagnosticians. Emphasis will be centered upon organizational behavior and how the leader can use the theories and research of the field in dealing with problems involving people. *4 qtr. hrs.*

EDA 922. STRATEGIC AND OPERATIONAL PLANNING: Development of the fundamental concepts, and procedures relative to effective planning. Applications of these concepts will also be made to program development and evaluation. *4 qtr. hrs.*

EDA 923. EFFECTIVE CATHOLIC SCHOOLS: Course focuses on the application of leadership theory and behavior in the Catholic school setting. *4 qtr. hrs.*

EDA 931. SEMINAR: WRITING FOR PUBLICATION: Course addresses the steps in the publication process including identifying a publishable topic, developing an appropriate writing style, creating a manuscript, assessing the quality of one's work and working with editors. Prerequisites: Admission to the Ph.D. Program and

completion of 30 quarter hours of doctoral program credit. Course may be taken only during the period of residency on campus. *3 qtr. hrs.*

EDA 932. INDEPENDENT LEARNING: REFLECTIONS ON FIELD EXPERIENCE: Taken in conjunction with required field involvements, students are to reflect upon their leadership behavior and the behavior of those with whom they work, to link theory and practice, and to generate theory from practice. Prerequisites: Admission to the Ph.D. Program and completion of 30 quarter hours of doctoral program credit. Course may be taken only during the period of residency on campus. *2 qtr. hrs.*

Department of
HEALTH, PHYSICAL EDUCATION, AND SPORT SCIENCE

Donald W. Morefield,
Chair of the Department

The Department of Health, Physical Education, and Sport Science offers a program leading to the Master of Science in Education. It is a flexible, personalized program providing the student with advanced training in physical education to develop special capabilities that will enable the student to become a competent practitioner and leader in the field of physical education.

ADMISSION REQUIREMENTS
(See School of Education requirements)

ADVISING

The coordinator of the graduate program within the department will act as the student's academic advisor. A personalized program will be planned

with the student during the first term of enrollment in an effort to meet the student's professional and personal goals and needs. The coordinator will also counsel the student on the purpose and requirements of graduate work, selection of courses, and the options available within the department.

PROGRAM REQUIREMENTS

A minimum of 45 quarter hours is required. Students must achieve an average of at least B (3.0) in all work undertaken to qualify for graduation.

Candidacy

A student becomes a candidate for the master's degree if the cumulative point average for graduate work, the preliminary plan for the research project (if Option A), and the reference appraisals are judged acceptable by the graduate committee of the Department of Health, Physical Education, and Sport Science.

The most important consideration in the admission of students to candidacy is the quality of their graduate work to date. Evidence of being able to meet all the graduation requirements must be given. The applicant who is deemed unqualified at this point will be advised to discontinue the program.

A student should apply for admission to candidacy after completion of 25 quarter hours of graduate work, including at least two courses in Physical Education and HPS 555, Survey of Research Processes and Design in Physical Education. Application is made by filing the official candidacy form with the Department of Health, Physical Education, and Sport Science.

Comprehensive Examination

Successful completion of a written comprehensive examination is required for graduation. The comprehensive examination, three hours in length, will basically cover the student's area of concentration (Physical Education courses). The examination may be taken during the student's last term of course work or upon the completion of the course work in the area of concentration. It is given once during each of the three regular terms. It is the student's responsibility to make formal

application one month in advance for the examination. Examination dates will be posted at the beginning of each term.

If a student fails the examination the first time, a second opportunity will be given. Failure the second time incurs failure and dismissal from the program.

Quarter Hours

Master of Science in Teaching Physical Education	45
Required Core Courses	16
EDT 502 Philosophical Studies in Education	4
EDT 501 Learning Theory and Education	4
OR	
EDT 504 Human Development and Education	4
HPS 555 Survey of Research Processes & Design in Physical Education	4
HPS 560 Evaluation & Applied Statistics in Physical Education	4

Area of Concentration—Physical Education 18 quarter hours

MUST TAKE A MINIMUM OF ONE COURSE FROM EACH OF THE THREE SUB—CATEGORIES. MUST DECLARE AREA OF INTEREST. SELECT ONE OF THE FOLLOWING SUB—CATEGORIES. MINIMUM OF THREE COURSES REQUIRED IN STUDENT’S AREA OF INTEREST.

Quarter Hours

I. Historical and Sociological Aspects of Physical Education	
HPS 510 History of Physical Education	4
HPS 519 Sport and Society	3
HPS 540 Women in Sport	4
HPS 575 Individual Studies in PE	1-8
II. Administration: Methodology	
HPS 523 Curriculum Development of Physical Education ...	3
HPS 529 Innovative Practice in P.E.	3
HPS 547 Administration of Interscholastic and Intramural Athletics	3
HPS 548 Safety and the Law in	

Physical Education and Sport	4
HPS 556 Issues in Physical Education (Seminar)	3
HPS 575 Individual Studies in PE	1-8

III. Scientific Basis

HPS 531 Nutrition for Exercise/Sport	3
HPS 532 Advanced Adapted Physical Education	4
HPS 537 Biomechanics	4
HPS 538 The Nature and Basis of Motor Skill Acquisition	3
HPS 550 Physiological Responses to Exercise	4
HPS 551 Laboratory Techniques for the Applied Practitioner	3
HPS 575 Individual Studies in PE	1-8

Electives 3-6
 Courses selected from general, professional, physical, or health education.

Options 5-8
 A. Research Project 5-8
 OR
 B. Additional coursework in physical education 5

COURSES OF INSTRUCTION

HPS 508. PHYSICAL EDUCATION WORKSHOPS: Workshops designed for study of special topics of current interest in physical education. May focus attention on substantive material or operational problems. May be repeated up to a maximum of 2 courses. *1-4 qtr. hrs.*

HPS 509. HEALTH EDUCATION WORKSHOPS: Workshops designed for study of special topics of current interest in health education. May focus attention on substantive material or operational problems. May be repeated up to a maximum of 2 courses. *1-4 qtr. hrs.*

HPS 510. HISTORY OF SPORT AND PHYSICAL EDUCATION: Study of the development of sport and physical education from early cultures to the present time. Emphasis on the United States. *4 qtr. hrs.*

HPS 514. MOVEMENT BASED PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOL: Designed for Elementary Education and Physical Education Graduate Students who are returning to school for recertification. *4 qtr. hrs.*

HPS 519. SPORT AND SOCIETY: A study of the cultural patterns, socializing process, and other psychosocial parameters of American sport. *3 qtr. hrs.*

HPS 523. CURRICULUM DEVELOPMENT OF PHYSICAL EDUCATION: Principles and procedures for curriculum construction and revision; criteria for selecting activities and judging outcomes; the place of physical education within the total curriculum. *3 qtr. hrs.*

HPS 529. INNOVATIVE PRACTICES IN PHYSICAL EDUCATION: Practical and theoretical study of innovative methods of teaching physical activities. *3 qtr. hrs.*

HPS 531. NUTRITION FOR EXERCISE/SPORT: A course designed to investigate the latest research trends in the nutritional assessment of the athlete. Topics to be discussed will pertain to dietary needs, fluid replenishment, pre-game meals, and “fad” diets for the athlete. *3 qtr. hrs.*

HPS 532. ADVANCED ADAPTED PHYSICAL EDUCATION: A course designed for prospective Adapted Physical Education Specialists. Emphasis is placed on the responsibility, process, and development of educating the exceptional population in a physical education setting. *4 qtr. hrs.*

HPS 537. BIOMECHANICS: Investigations of physical principles operative in the performance of physical education activities with attempts to analyze for methods of greater effectiveness and improved performance. *4 qtr. hrs.*

HPS 538. THE NATURE AND BASIS OF MOTOR SKILL ACQUISITION: A study of psychological factors which affect the acquisition of motor skills. Perceptual-motor development theories. Motor behavior. *3 qtr. hrs.*

HPS 540. WOMEN IN SPORT: A study of the historical, psychological, sociological and biophysical aspects of the American woman in sport. *4 qtr. hrs.*

HPS 547. ADMINISTRATION OF INTERSCHOLASTIC AND INTRAMURAL ATHLETICS: Organization of high school athletic and intramural programs, staff, program, budget, health and safety, and other phases of administration. *3 qtr. hrs.*

HPS 548. SAFETY AND THE LAW IN PHYSICAL EDUCATION AND SPORTS: Study of basic safety measures to prevent injuries and avoid legal suits. Investigation of the fundamental principles involved in the legal aspects of sports in contemporary society. Analysis of specific court cases dealing with negligence in physical education and sport. *4 qtr. hrs.*

HPS 550. PHYSIOLOGICAL RESPONSES TO EXERCISE: A study of the physiological changes that occur during exercise and training. *4 qtr. hrs.*

HPS 551. LABORATORY TECHNIQUES FOR THE PHYSICAL EDUCATION PRACTITIONER: The practical application of selected physical education tests and measurements. Emphasis will be placed on human performance (strength, cardiovascular, flexibility, and body composition) testing. *3 qtr. hrs.*

HPS 555. SURVEY OF RESEARCH PROCESSES AND DESIGN IN PHYSICAL EDUCATION: This course is designed to develop an understanding of the nature of the general field of physical education research. It emphasizes the application of various research processes and design, learning by doing, and learning through example. It is intended for use by individuals who have minimal knowledge of statistics. *4 qtr. hrs.*

HPS 556. ISSUES IN PHYSICAL EDUCATION (SEMINAR): A seminar to investigate and report on a specific issue in physical education. *3 qtr. hrs.*

HPS 560. EVALUATION AND APPLIED STATISTICS IN PHYSICAL EDUCATION: Application of descriptive and inferential statistics to physical education tests and measurements. Qualitative and quantitative analysis of selected physical fitness, motor performance, and body composition data. *4 qtr. hrs.*

HPS 575. INDIVIDUAL STUDIES IN PHYSICAL EDUCATION: Individual investigations of a problem in physical education or health. (With approval of advisor.) *1-8 qtr. hrs.*

EDH 575. INDIVIDUAL STUDIES IN HEALTH: Individual investigations of a problem in health. (With approval of advisor) *1-4 qtr. hrs.*

HPS 582. INTERNSHIP IN PHYSICAL EDUCATION: A job-related experience under the immediate supervision of personnel from a local school or community organization. *4 qtr. hrs.*

HPS 591. RESEARCH PROJECT: Action research initiated after consultation with advisor. A systematic study of a specific problem. Prerequisite for registration: Completion of HPS 555 and 560 and approval of preliminary plan. *1-6 qtr. hrs.*

Department of
**TEACHER
EDUCATION (EDT)**

Roberta Weaver,
Chair of the Department

The Teacher Education Department's mission is the development of competent and humane teachers. Recognizing the value of balancing theory and practice in professional education, the department provides its students and faculty with the opportunity to be of service and to do research in schools and in other educational

agencies. It dedicates itself to the discovery and transmission of the knowledge, skills, attitudes, and values which enable teachers to become educational leaders. Its goal is to be a center of excellence in teacher education.

The department offers nine concentrations at the graduate level:

- Art Education
- Computers in Education
- Early Education of Handicapped Children
- Elementary Education
- Interdisciplinary Studies
- Literature and Whole Language
- Reading Teacher
- Secondary Education
- Teacher as Leader

The department also offers the initial teaching certificate for students desiring to teach in elementary or secondary schools and certification in:

- Developmentally Handicapped
- Multi-handicapped
- Specific Learning Disabled
- Kindergarten-primary

Not all programs are offered at all off-campus centers. Students should contact the Chair, Department of Teacher Education, to determine which concentrations are available.

**ADMISSION
REQUIREMENTS**
(See School of Education requirements)

Students taking courses in the Department of Teacher Education may apply a maximum of 12 quarter hours earned as an Unclassified Graduate Student toward the master's degree. Therefore, all students taking graduate classes are to apply for regular graduate admission.

If students have student teaching as part of their program, they must apply for an assignment in the term prior to the student teaching term. (Applications are available in the department office.)

CORE REQUIREMENTS FOR THE MASTER'S DEGREE

- | | <i>Quarter Hours</i> |
|--|----------------------|
| 1. EDT 500 Models of Teaching ... | 4 |
| 2. EDT 502 Philosophical Studies in Education | 4 |
| 3. EDT 503 Educational Research Methodology | 4 |
| 4. EDT 670 Master's Project | 5 |
| 5. A minimum of 45 quarter hours with not more than 8 quarter hours being workshops (i.e. codes with W, such as EDT 508W, and courses for which the grade is CR/NC). | |
| 6. Participation in the departmental conference held in the final term of the student's program. | |

Notes

1. EDT 503 should be taken before the 30th quarter hour (i.e., three fourths of the way through the program).
2. Students should register for the Master's Project in the term they expect to graduate. EDT 500, 502, and 503 and at least three-fourths of the concentration courses need to be completed prior to registration for EDT 670.

CONCENTRATION REQUIREMENTS

- | Art Education | <i>Quarter Hours</i> |
|---|----------------------|
| ART 490 Art History | 4.5 |
| COM 508 Interpersonal Communication | OR |
| COM 527 Small Group Process | OR |
| COM 537 Conflict Resolution through Communication | 4.5 |
| PHL 653 Aesthetics | 4.5 |
| EDT 620 Curriculum Theory in Art Education | 3 |
| EDT 622 Current Issues in Art Education | 3 |
| | Electives |
| | 9 |

Note:

Students interested in the Art Education Program should make an appointment to meet with Dr. Mary Zahner.

Computers in Education

- | | <i>Quarter Hours</i> |
|--|----------------------|
| EDT 538 Introduction to Computers (See Note 1) | 4 |

- | | |
|--|--------------------------|
| EDT 539 Computers in Education (See Note 1) | 4 |
| EDT 540 Advanced Computers in Education | 4 |
| EDT 541 Methods: Computers in Education | 4 |
| EDT 542 Special Topics: Computers in Education | 4 |
| | Approved Electives |
| | 8 |

Notes

1. Students who wish to test out of either EDT 538 or EDT 539 should contact the Director of the Computer Center.
2. Students should register for a total of four quarter hours for EDT 542, which consists of different workshop experiences.

Early Education of Handicapped

- | Children | <i>Quarter Hours</i> |
|---|----------------------|
| EDT 504 Human Development ... | 4 |
| EDT 590 Introduction to Exceptionalities | 4 |
| EDT 517 Introduction to Early Childhood | 4 |
| EDT 516 Pre K (ages 3-5) Curriculum & Instruction | 4 |
| EDT 514 Infant & Toddler Development | 3 |
| | OR |
| EDT 518 K-P (ages 5-8) Curriculum & Instruction | 4 |
| EDT 579 Assessment Skills and Collaborative Functioning | 4 |
| EDT 586 Seminar on ECSE Health & Medical Issues | 3 |
| EDT 523 Internship ECSE (ages 3-5) | 4 |

Elementary Education

- | | <i>Quarter Hours</i> |
|--------------------------------------|----------------------|
| Approved Concentration Courses | 20 |
| Approved Electives | 8 |

Note:

The program may be level specific (i.e., primary, elementary), subject related (i.e., language arts, social studies, etc.), or directed toward developing instructional strategies (i.e., individualized instruction, learning style, media, etc.). The program and elective courses must be decided by the student and the advisor. Students should submit a curriculum plan to their advisor for their proposed program before completing 12 quarter hours of graduate work.

INTERDISCIPLINARY EDUCATIONAL STUDIES

- | | <i>Quarter Hours</i> |
|-------|--|
| ----- | Approved Concentration Courses in Education |
| | 16 |
| ----- | Approved Concentration Courses outside Education |
| | 12 |

Notes

1. Students in the Interdisciplinary program normally draw courses offered by two or more departments in the University. One of those departments must be outside the School of Education. Students must prepare a plan of study identifying objectives, courses, and tentative time-line.
2. The student should meet with two or more faculty members from the two or more departments involved to lay out the approved program courses.

Literature and Whole Language

- | | <i>Quarter Hours</i> |
|--|---|
| EDT 543 Literature for Children .. | 4 |
| | OR |
| EDT 555 Young Adult Literature . | 4 |
| EDT 550 Introduction to Whole Language | 4 |
| EDT 551 Whole Language II | 4 |
| EDT 556 Whole Language III | 4 |
| | One Additional Whole Language Course/Workshop |
| EDT 557 International Literature . | 4 |
| | Materials Production for a Whole Language Primary Classroom |
| | 3 |

Reading Teacher

(Endorsement) K-12

- | | <i>Quarter Hours</i> |
|--|----------------------|
| EDT 544 Reading & Language Arts in the Elementary School | 5 |
| | OR |
| EDT 550 Introduction to Whole Language | 4 |
| *EDT 546 Research in Reading | 4 |
| EDT 547 Diagnosis of Reading Difficulties | 4 |
| EDT 548 Practicum in Diagnosis of Reading | 4 |
| EDT 543 Literature for Children .. | 4 |
| | OR |
| EDT 555 Young Adult Literature . | 4 |

EDT 554 Reading in the Content Area 3
 Approved Electives (to total 28 qtr. hrs.)

Notes:

1. EDT 544 is the prerequisite for all other reading courses.
2. On the main campus, EDT 547 and 548 should be taken concurrently.
3. Students with elementary certification should take EDT 550.
- *4. EDT 546 required for degree, but not certification.

Secondary Education

Quarter Hours

Approved Concentration Courses 20
 Approved Electives 8

Note:

The concentration may be subject-related (i.e. social studies, business English, etc.) or directed toward developing instructional strategies (i.e., individualized instruction, learning styles, media, etc.). The concentration and elective courses must be decided by the student and the advisor. Students should submit a curriculum plan to their advisor for their proposed program before completing 12 credit hours of graduate work.

Teacher as Leader

Quarter Hours

EDT 513 Professional Development in Teacher Leaders 3
 EDT 550 Introduction to Whole Language 4
 EDT 539 Computers in Education (See note 2) 4
 EDA 509 Supervision 4
 EDA 511 Curriculum 4
 One course from:
 EDT 511 History of Education in the United States 4
 OR
 EDT 512 History of Higher Education in the United States 4
 Approved Electives 5

Notes:

1. With additional coursework, candidates who complete this program can earn a supervisor's certificate. Those interested in earning this certificate should contact the chair of the Educational Administration Department.

2. Students who test out of EDT 539 can substitute another computer course.

INITIAL TEACHING CERTIFICATE

Elementary (See Note 4)

Quarter Hours

Area A

EDT 501 Learning Theory and Education 4
 EDT 504 Human Development and Education 4

Area B

EDT 570 School, Self, and Society 4
 EDT 591 Mainstreamed Handicapped Students 4
 EDT 543 Literature for Children .. 4

Area C

EDT 526 b Mathematics and Science in the Elementary School 4
 EDT 528 b Teaching in the Elementary School 4
 EDT 544 b Reading & Language Arts in Elementary School 5
 EDT 635 b Social Studies in Elementary School 4
 EDT 682 b Art and Music in the Elementary School 3
 EDT 529 Student Teaching: Elementary 10

Notes:

1. Each candidate must satisfy a content area requirement of 20 semester hours or 30 quarter hours in an approved pattern of coursework in mathematics, psychology, history, physical science, literature (English), biological science or some other approved field.
2. All of the courses have field and/or clinical experiences.
3. The "b" courses are block classes that students take at the same time.
4. Students interested in this certificate must have their transcripts evaluated by a departmental secretary, and be accepted into the graduate program.
5. Students must satisfy a general education requirement of 30

semester hours or 45 quarter hours well distributed over the following areas: biological or physical sciences, humanities, communication, western civilization, American History, mathematics, health and physical education, music, and visual art.

6. Before student teaching a student must have the equivalent of 300 hours of field and clinical experience. (See Placement Office, C-226)
7. Candidates must demonstrate basic skills competency (e.g., PPST) during the first two terms of their enrollment. This requirement must be met prior to student teaching.
8. The cumulative Grade Point Average must be 3.0 in professional education courses.
9. Students desiring a master's degree in addition to certificate must complete the CORE requirements and fulfill admission requirements.
10. Students must successfully pass the state mandated NTE.
11. EDT 526, 528, 544 and 635 are prerequisites for EDT 500.

SECONDARY

Quarter Hours

Area A

EDT 501 Learning Theory and Education 4
 EDT 504 Human Development and Education 4

Area B

EDT 570 School, Self and Society 4
 EDT 505 Human Relations in Education 3
 EDT 554 Reading in the Content Area 3

Area C

EDT 591 b Mainstreamed Handicapped Students 4
 EDT b Special Methods in Practical Teaching Field 4
 EDT 572 b Student Teaching: Secondary 10

Notes

1. A student must have coursework in the teaching field consistent with

the content and scope required for the teaching area. If the student needs additional coursework in the teaching field for certification, courses in the teaching field will be suggested. Graduate level courses in teaching fields are available in the following areas: biology, business, chemistry, communication, English, history, mathematics, physics, political science, and theological studies. Transcript evaluations will be completed by the Dean's office (Undergraduate Secretary). The student then must be accepted in the graduate program.

2. A cumulative point average of 2.5 in each teaching field is required for certification.
3. All of the courses have field and/or clinical experiences.
4. The cumulative GPA must be 3.0 in professional education courses.
5. The "b" courses are block classes that students take concurrently.
6. Students must have 30 semester hours in general education distributed over the following areas: science, mathematics, social sciences, English and/or foreign languages, fine arts, religion or philosophy, and humanities.
7. Before being allowed to student teach (secondary) students must have the equivalent of 300 clock hours of field and clinical experience.
8. Students desiring a master's degree in addition to certification must complete the CORE requirements and fulfill admissions requirements.
9. Candidates must demonstrate basic skills competency during the first two terms of enrollment. This requirement must be met prior to student teaching.
10. Students must successfully pass the state mandated NTE.
11. Successful completion of a methods course is a prerequisite for EDT 500.

Additional Certification Programs

The Department of Teacher Education also offers certification through graduate coursework in the following areas: Developmentally Handicapped, Multi-handicapped, Specific Learning

Disabled, and Kindergarten-Primary. Persons interested in pursuing these certifications should contact the Dean's office (Undergraduate Secretary) or the Department of Teacher Education.

COURSES OF INSTRUCTION

EDT 500. MODELS OF TEACHING: Analysis and experimentation with several models of teaching that are useful in studying classroom interactions and evaluating teacher performance. 4 qtr. hrs.

EDT 501. LEARNING THEORY AND EDUCATION: Study of contemporary learning theories such as Behaviorism, Gestalt, and cognitive-field psychologies. Interpretations are made for teaching methodology, curriculum design, counseling, and psychological services. Field and/or Clinical experiences. 4 qtr. hrs.

EDT 502. PHILOSOPHICAL STUDIES IN EDUCATION: Study of writings of major philosophers as they relate to education (including those in the Marianist tradition). Interpretations are made for the development of a critical, personal theory of teaching, counseling, educational administration, and psychological services. 4 qtr. hrs.

EDT 503. EDUCATIONAL RESEARCH METHODOLOGY: Study of educational research design, proposal writing, organization of data, and techniques for conducting research in teaching, administration, and counseling. Emphasis is on developing a proposal to conduct an individual research project. Prerequisites: EDT 500 and EDT 502. 4 qtr. hrs.

EDT 504. HUMAN DEVELOPMENT IN EDUCATION: The study of contemporary developmental theories, including those of Freud, Skinner, Maslow, Kohlberg, Erikson, and Piaget, with interpretations made for teaching methodology, educational administration, counseling, and psychological services. Clinical experiences. 4 qtr. hrs.

EDT 505. HUMAN RELATIONS IN EDUCATION: Study and development of the human relations skills that promote learning and democratic classroom interaction and management regardless of race, political affiliation, religion, age, sex, socio-economic status, or exceptionality. Clinical experience. 3 qtr. hrs.

***EDT 506. VALUES CLARIFICATION AND MORAL DEVELOPMENT:** Examination and evaluation of the theories and techniques of clarifying values and facilitating moral development in students with varied needs and abilities. 4 qtr. hrs.

***EDT 507. TEACHING AND LEARNING STYLES:** Presentation of the research on learning styles and teaching styles. Interpretations are made for teaching methodology, educational administration, and counseling. 2 qtr. hrs.

***EDT 508. CURRENT CONTROVERSIES IN EDUCATION:** Study of selected controversies in education as they relate to policy and practice. 2 qtr. hrs.

***EDT 509. COMPARATIVE EDUCATION:** Study of educational systems in selected countries. Appropriate comparisons of systems of education in Marxist countries and those in democratic countries. Special projects. 4 qtr. hrs.

EDT 510. POLITICS OF EDUCATION: Study of educational policy-making at the local, state, and federal levels. Specific attention is given to the interdependence of these levels as related to contemporary issues. 4 qtr. hrs.

EDT 511. HISTORY OF EDUCATION IN THE UNITED STATES: Study of the relationship of schools and social changes in the United States from colonial times to the present. Interpretations of changes in educational policies for the development of a critical theory of education. Second term. 4 qtr. hrs.

EDT 512. HISTORY OF HIGHER EDUCATION IN THE UNITED STATES: Study of the development of post-secondary education in the United States from the Colonial period to the present with special emphasis on topics such as liberal arts, vocational preparation, and community colleges. *4 qtr. hrs.*

EDT 513. PROFESSIONAL DEVELOPMENT OF TEACHER LEADERS: A study of existing and emerging models of professional development designed to provide classroom teachers with opportunities to assume new leadership roles and responsibilities in the school community. *3 qtr. hrs.*

EDT 514. INFANT/TODDLER DEVELOPMENT (BIRTH-3): The study of human development from conception to age 3 and the implications for early childhood curriculum and instruction. This course is intended for students pursuing certification or a degree in early childhood education. Field and clinical experiences. Prerequisites EDT 504 and EDT 590. *3 qtr. hrs.*

EDT 516 (4). PRE-KINDERGARTEN (AGES 3-5) CURRICULUM AND INSTRUCTION: Study of the organization and structure of pre-kindergarten programs including working with parents, laws and regulations, operational strategies, and developmentally appropriate teaching methods and materials. Field and clinical experiences. Prerequisite: EDT 517. *4 qtr. hrs.*

EDT 517 (4). INTRODUCTION TO EARLY CHILDHOOD EDUCATION: Study of the development of children from birth through age eight, including psychology of learning and the examination of the cultural, economic, governmental, and social factors that affect family and child. Field and clinical experiences. *4 qtr. hrs.*

EDT 518 (4). KINDERGARTEN-PRIMARY (AGES 5-8) CURRICULUM AND INSTRUCTION: Planning, diagnosis, instructional methods, materials, and evaluation techniques for teaching children on the kindergarten-primary levels. Field and clinical experiences. Prerequisites EDT 504 and EDT 517. *4 qtr. hrs..*

EDT 519. INSTRUCTIONAL MATERIALS—K-3: Study of psychological principles that should guide instructional material selection; examination, development, and evaluation of materials for kindergarten-primary teaching. Clinical experience. *4 qtr. hrs.*

EDT 520. STUDENT TEACHING—PRE-KINDERGARTEN: Supervised and evaluated teaching in a pre-kindergarten. Student is to demonstrate the knowledge, skills, attitudes, and values required of a beginning pre-kindergarten teacher. Weekly seminar. Prerequisites: EDT 517 and see advisor. *4 qtr. hrs.*

EDT 521. STUDENT TEACHING—KINDERGARTEN-PRIMARY: Full-time supervised and evaluated teaching in a K-3 setting. Student is to demonstrate the knowledge, skills, attitudes and values required of a beginning K—P teacher. Weekly seminar. Prerequisites: EDT 518 and see advisor. *4 qtr. hrs.*

EDT 522 (4). INTERNSHIP-INFANT/TODDLER (BIRTH-3): Supervised and evaluated teaching in an integrated infant/toddler educational setting. Student is to demonstrate the knowledge, skills, attitudes, and values required of a beginning infant/toddler teacher. Weekly seminar. Prerequisites EDT 504, EDT 590, EDT 514, EDT 517, EDT 579, EDT 535, and EDT 586. *4 qtr. hrs.*

EDT 523 (4). INTERNSHIP EARLY CHILDHOOD SPECIAL EDUCATION (AGES 3-5): Supervised and evaluated teaching in an integrated preschool (Ages 3-5) setting. Student is to demonstrate the knowledge, skills, attitudes, and values required of a beginning EEH (Ages 3-5) teacher. Prerequisites EDT 504, EDT 590, EDT 517, EDT 579, EDT 516, and EDT 586. *4 qtr. hrs.*

EDT 526. MATHEMATICS AND SCIENCE IN THE ELEMENTARY SCHOOL: Course for teachers and administrators dealing with modern math and science programs. Demonstration of how patterns of mathematical and scientific thought can be acquired by students. Field experience. Prerequisite: EDT 528. *4 qtr. hrs.*

EDT 528. TEACHING IN THE ELEMENTARY SCHOOL: Study of the role of the teacher in the classroom including classroom management and human relations, lesson planning, assessment, instructional methods and media, and evaluation of teaching. Clinical experience. Prerequisites: EDT 501 and EDT 504. *4 qtr. hrs.*

EDT 529. STUDENT TEACHING—ELEMENTARY: Full-time supervised and evaluated teaching for a full term in an elementary school. Student is to demonstrate the knowledge, skills, attitudes, and values required of a beginning elementary school teacher. Weekly seminar. Prerequisites: Formal admission to student teaching a full term in advance and methods courses. *5-10 qtr. hrs.*

EDT 535 (4). INFANT/TODDLER (BIRTH-3) CURRICULUM AND INSTRUCTION: Planning, instructional methods, materials, and evaluation techniques for teaching young children (Birth-3). Clinical and field experiences. Prerequisite EDT 514. *4 qtr. hrs.*

***EDT 536. TOPICS IN CREATIVE TEACHING:** The course goals are to foster the creative nature of the student, to demonstrate how this creativity can be applied to teaching with free/inexpensive materials, and to teach the student how to plan for the use of these materials. *1-4 qtr. hrs.*

EDT 538. INTRODUCTION TO COMPUTERS IN EDUCATION: The course is an introduction for those learners who have had little or no experience in using microcomputers in the classroom. The course focuses on word processing skills in the Apple and DOS environments. *4 qtr. hrs.*

EDT 539. COMPUTERS IN EDUCATION: The purpose of the course is to introduce the learner to the uses of the computer as a tool in the classroom. The course focuses on applications of word processing, spreadsheet, data base, graphics, utilities, and simple programming. Prerequisite: EDT 538. *4 qtr. hrs.*

*Course not offered on a regular basis

EDT 540. ADVANCED COMPUTERS IN EDUCATION: The course examines different software applications and instructional courseware for integrating computer activities with classroom instruction. Prerequisite: EDT 539. *4 qtr. hrs.*

EDT 541. METHODS: COMPUTERS IN EDUCATION: The educator enrolled in this course will examine the knowledge and skills necessary to become a resource person for using computers in the classroom, the building, and the educational laboratory setting. Prerequisite: EDT 540. *4 qtr. hrs.*

EDT 542. ADDITIONAL TOPICS: COMPUTERS IN EDUCATION: The course is an examination of current topics and issues in emerging technologies with direct application to the educational setting. Prerequisite: EDT 540. *4 qtr. hrs.*

EDT 543. LITERATURE FOR CHILDREN: Study of children's books to develop critical standards for judgment. Guidance in selection of books for specific needs, interests, and reading abilities in eight genres; instructional techniques for use in the classroom. Clinical experience. *4 qtr. hrs.*

EDT 544. READING AND LANGUAGE ARTS IN THE ELEMENTARY SCHOOL: An integrated language arts course focusing upon the knowledge base undergirding the teaching of reading and related language arts processes in the elementary school setting. *5 qtr. hrs.*

EDT 545. ADVANCED DEVELOPMENTAL READING: The psychological and sociological basis in reading. Attention is given to linguistics, materials, skills, literature, and evaluation. Prerequisite: EDT 528. *4 qtr. hrs.*

EDT 546. RESEARCH IN READING INSTRUCTION: A basic course for teachers concerned with the psychology of learning reading and with current problems and trends in reading and children's literature. Prerequisites: EDT 544 or 545. *4 qtr. hrs.*

EDT 547. DIAGNOSIS OF READING DIFFICULTIES: Study of formal and informal diagnostic tests and procedures for identifying reading strengths and weaknesses with applications for reading programs. Field experience. Summer term. Prerequisite: EDT 544 or 545. *4 qtr. hrs.*

EDT 548. PRACTICUM IN DIAGNOSIS OF READING: Laboratory portion of EDT 547. Summer term. Corequisite or Prerequisite: EDT 547. *4 qtr. hrs.*

EDT 550. INTRODUCTION TO WHOLE LANGUAGE INSTRUCTION: This course includes a study of the theory, practice, and research of Whole Language learning. Teachers and children in a Whole Language classroom are engaged in meaningful learning that involves reading, thinking, evaluating, and reasoning. The course will incorporate multiple techniques for studying this approach as well as methods for individualizing instruction for students. A knowledge of children's literature is necessary to actively participate. *4 qtr. hrs.*

EDT 551. WHOLE LANGUAGE IN PRACTICE: This course will focus on the application in the classroom of the Whole Language approach to teaching. Participants will examine methods of incorporating literature and process writing into different subjects across the curriculum. Techniques for evaluation and assessment will be discussed. Knowledge of children's literature and Whole Language theory, research and practice are prerequisites. *4 qtr. hrs.*

***EDT 553. TOPICS IN READING:** This course is designed for teachers and supervisors. It consists of readings, discussions, and written reports on the most recent topics in reading. Prerequisite: Teaching experience and at least one reading course. *4 qtr. hrs.*

EDT 554. READING IN THE CONTENT AREAS: Study of reading problems and techniques for teaching vocabulary and reading skills in various content areas. Clinical experience. Field experience for secondary education majors. *1-4 qtr. hrs.*

EDT 555. YOUNG ADULT LITERATURE: Study of the development of literature for adolescents (grades 6-12), formulation of criteria for judging various genres of literature, and integration of young adult literature in the curriculum. *4 qtr. hrs.*

EDT 556. WHOLE LANGUAGE III: Culminating course in the whole language sequence. The course will integrate, apply, and extend the themes of whole language as well as explore various dissemination formats. Prerequisites: EDT 550 & 551. *4 qtr. hrs.*

EDT 557. INTERNATIONAL LITERATURE: Exploration of children's literature focusing upon global and environmental themes from various cultural and ethnic perspectives. *4 qtr. hrs.*

***EDT 559. INTERDISCIPLINARY TEACHING:** Study of the basic principles, problems, and alternatives in team teaching and interdisciplinary education. *4 qtr. hrs.*

EDT 562. ENGLISH AND SPEECH IN SECONDARY SCHOOL: Planning, diagnosis, instructional methods, materials, and evaluation techniques for teaching English and speech to students with varied needs and abilities. Field and clinical experience. First term. Prerequisites: EDT 501 and 504. *4 qtr. hrs.*

EDT 563. SOCIAL STUDIES IN SECONDARY SCHOOL: Planning, diagnosis, instructional methods, materials, and evaluation techniques for teaching social studies to students with varied needs and abilities. Field and clinical experience. First term. Prerequisites: EDT 501 and 504. *4 qtr. hrs.*

EDT 564. FOREIGN LANGUAGE TEACHING: Planning, diagnosis, instructional methods, materials, and evaluation techniques for teaching foreign languages in elementary and secondary schools to students with varied needs and abilities. Field and clinical experience. First term. Prerequisites: EDT 501 and 504. *4 qtr. hrs.*

EDT 565. MATHEMATICS IN THE SECONDARY SCHOOL: Planning, diagnosis, instructional methods, materials, and evaluation techniques for teaching mathematics to students with varied needs and abilities. Field and clinical experience. First term. Prerequisites: EDT 501 and 504.

4 qtr. hrs.

***EDT 566. RELIGION IN THE SCHOOL:** Modern methods of instruction in religion in the school with a view to the needs of children and adolescents. Prerequisite: EDT 570.

4 qtr. hrs.

EDT 567. SCIENCE IN SECONDARY SCHOOL: Planning, diagnosis, instructional methods, materials, and evaluation techniques for teaching the biological and physical sciences to students with varied needs and abilities. Field and clinical experience. Prerequisites: EDT 501 and 504.

4 qtr. hrs.

EDT 570. SCHOOL, SELF, AND SOCIETY: Study of the relationship between institutional reform, personal development, and social change; comparison of rural, urban, and suburban schools and social settings; study of the laws and policies affecting the education of handicapped students. Field and clinical experience.

4 qtr. hrs.

EDT 571. BUSINESS EDUCATION IN SECONDARY SCHOOL: Planning, diagnosis, instructional methods, materials, and evaluation techniques for teaching business to students with varied needs and abilities. Field and clinical experience. First term. Prerequisite: EDT 501 and 504.

4 qtr. hrs.

EDT 572. STUDENT TEACHING—SECONDARY: Full-time supervised and evaluated teaching in content area junior or senior high school classroom. Student is to demonstrate the knowledge, skills, attitudes, and values required of a beginning secondary teacher after completion of a 65-hr. on-site clinical experience. Weekly seminar. Prerequisites: Admission to student teaching a full semester in advance, methods course.

5-10 qtr. hrs.

EDT 579. ASSESSMENT SKILLS AND COLLABORATIVE FUNCTIONING: Study of the multi-disciplinary and collaborative nature of assessment in the diagnosis, planning, and evaluation of young children with special needs, including the development of individual family plans and individual education plans. Field and clinical experiences. Prerequisites EDT 590 and EDT 517.

4 qtr. hrs.

EDT 580. PSYCHOLOGY AND EDUCATION OF THE MENTALLY RETARDED: Study of identification, characteristics, learning theories, and curriculum planning appropriate to the mentally retarded. Field experience. Prerequisite: EDT 590.

4 qtr. hrs.

EDT 581. ASSESSMENT OF THE SPECIAL-NEEDS LEARNER. Study of the multidisciplinary use of assessment devices and techniques in the diagnosis, planning, and evaluation of the special-needs learner and the development of individual education plans. Clinical experience. Prerequisite: EDT 590.

4 qtr. hrs.

EDT 582. STUDENT TEACHING—MH: Full-time supervised and evaluated teaching in an MH classroom. Student is to demonstrate the knowledge, skills, attitudes, and values required of a beginning MH teacher. Weekly seminar. Prerequisite: EDT 592, EDT 589.

5-10 qtr. hrs.

EDT 584. ADVANCED BEHAVIOR MANAGEMENT: Study of the principles and methods of dealing with the hard-to-manage student. Clinical experience. Prerequisite: EDT 596.

3 qtr. hrs.

EDT 585. STUDENT TEACHING—DH: Full-time supervised and evaluated teaching in a DH classroom. Student is to demonstrate the knowledge, skills, attitudes, and values required of a beginning DH teacher. Weekly seminar. Prerequisite: EDT 592.

5-10 qtr. hrs.

EDT 586. SEMINAR ON EARLY CHILDHOOD SPECIAL EDUCATION HEALTH AND MEDICAL NEEDS: Study of the health care

needs and medical aspects of disabilities associated with EEH. Medical personnel and health care agency staff serve as invited speakers. Field and clinical experiences. Prerequisites EDT 590 and EDT 517.

3 qtr. hrs.

EDT 587. CAREER EDUCATION FOR HANDICAPPED: Theory and techniques of job classification, assessment, selection, placement, and activities related to work experience from pre-school to adult. Prerequisite: EDT 590 or concurrently.

3 qtr. hrs.

EDT 588. COUNSELING PARENTS OF EXCEPTIONAL CHILDREN: Theory and techniques to help teachers work with parents to improve home-school relationships and to develop parent-teacher partnerships. Prerequisite: EDT 590 or concurrently.

4 qtr. hrs.

EDT 589. MULTI-HANDICAPPED: Curriculum, planning, diagnosis, instructional methods, materials, and evaluation techniques for teaching the pre-school to adult multi-handicapped. Clinical experience. Prerequisite: EDT 580.

3 qtr. hrs.

EDT 590. INTRODUCTION TO EXCEPTIONALITIES: Study of the special needs learner. Designed for majors in the Early Education of Handicapped Children program. Covers definition, etiology, characteristics, and educational options. Field and clinical experiences.

4 qtr. hrs.

EDT 591. MAINSTREAMED HANDICAPPED STUDENTS: Study of special needs learners and the difficulties they face in the mainstreamed classroom. Emphasis on resources, curricular modifications, and instructional strategies that facilitate learning. Clinical experience.

4 qtr. hrs.

EDT 592. CURRICULUM AND METHODS — MR: Curriculum development, instructional materials, and evaluation techniques and individual programming for the MR student. Field/clinical experience. Prerequisite: EDT 580.

6 qtr. hrs.

EDT 593. EDUCATING STUDENTS WITH SLD: Study of history, identification, characteristics, learning theories, and curriculum planning appropriate to the education of students with specific learning disabilities. Field and clinical experience. Prerequisite: EDT 590 or concurrently. 4 qtr. hrs.

EDT 594. DIAGNOSTIC TEACHING IN SLD: Instructional strategies, materials, and evaluation techniques for teaching students with learning disabilities. Field experience. Prerequisite: EDT 593. 4 qtr. hrs.

EDT 595. STUDENT TEACHING—SLD: Full-time supervised and evaluated teaching in an SLD classroom. Student is to demonstrate the knowledge, skills, attitudes, and values of a beginning SLD teacher. Prerequisite: EDT 594. 5-10 qtr. hrs.

EDT 596. BEHAVIOR MANAGEMENT: Principles and methods of observing, recording, measuring, and managing human behavior with emphasis on students with mental retardation, learning disabilities, and behavior disorders. Prerequisite: EDT 590 or concurrently. 4 qtr. hrs.

EDT 597. CHILD/YOUTH LEADERSHIP: Purposes are to enable the participant (1) to understand the learner as a human being; (2) to gain skills in describing an individual's behavior; and (3) to learn group leadership skills. The participant will thus be able to lead a child/youth study group. 4 qtr. hrs.

EDT 598. CHILD/YOUTH STUDY: Participants will master specified processes as each studies one pupil through a case study, to include (1) writing descriptive anecdotes; (2) becoming familiar with a framework that permits organizing and analyzing individual behavior; (3) using a scientific approach to understanding selected bits of behavior; and (4) summarizing a pupil's experience from both the pupil's and the school's point of view. 4 qtr. hrs.

EDT 599. ADVANCED CHILD/YOUTH LEADERSHIP: This is designed to produce professional

educators who have mastered the skills, knowledge, and attitudes to serve as leaders of advanced child study groups. Emphases are upon (1) group leadership skills; and (2) processes which as a part of Advanced Child/Youth leadership lead to an understanding of the growing and schooling experience from the internal frame of reference of child/youth. Prerequisite: EDT 598.

4 qtr. hrs.

EDT 600. ADVANCED CHILD/YOUTH STUDY: Groups of professional educators study individual children/youth through a case record which includes mastering scientific processes that permit an analysis of the pupil's world. 4 qtr. hrs.

***EDT 620. CURRICULUM THEORY IN ART INSTRUCTION.** An analysis of critical, aesthetic, artistic and historical inquiries in the curriculum, with emphasis on the interdependence of the community, school, art educator and student in multi-cultural, cross-cultural settings. 3 qtr. hrs.

***EDT 622. CURRENT ISSUES IN ART EDUCATION:** Study and analysis of literature on teaching approaches to art education. The role of the art teacher is examined with emphasis on the development of an awareness of various philosophical positions on current issues in art education. 4 qtr. hrs.

***EDT 627. VOCAL MUSIC IN HIGH SCHOOL:** Study of instructional content, instructional strategies, etc. for the vocal music educator in the secondary school. 4 qtr. hrs.

EDT 628. TOPICS IN MUSIC EDUCATION: A seminar in which current issues, problems, etc. are studied by music educators. 1-4 qtr. hrs.

***EDT 634. TOPICS IN SCIENCE INSTRUCTION:** Study of research in contemporary science instruction, materials, and curriculum. 1-4 qtr. hrs.

EDT 635. SOCIAL STUDIES IN THE ELEMENTARY SCHOOL: Planning, diagnosis, instructional methods, materials, and evaluation

techniques for teaching social studies to students with varied needs and abilities. Clinical and field experience. Prerequisite EDT 528. 4 qtr. hrs.

***EDT 636. TOPICS IN MATHEMATICS INSTRUCTION:** Study of research in contemporary mathematics instruction. Emphases include effective curriculum and curricular materials. 1-4 qtr. hrs.

EDT 638. EDUCATIONAL STATISTICS: Study of basic statistics used to describe groups of inferential statistics for determining parameters in observed samples, and for formulating valid inferences and interpretations. Prerequisite: EDT 503. 4 qtr. hrs.

***EDT 639. EDUCATIONAL RESEARCH DESIGN:** Study of the techniques for organizing and managing an educational research project. Designed to assist students in setting up their research project. Prerequisite: EDT 503. 2 qtr. hrs.

***EDT 640. INTERNSHIP IN EDUCATIONAL RESEARCH AND EVALUATION:** Participation in actual school-related research or evaluation activities in the Office of Educational Services, in elementary or secondary schools, or in higher education. Emphasis is on all activities of research and evaluation from conceptualization to final reporting. Prerequisite: EDT 639. 4-8 qtr. hrs.

EDT 645. INDIVIDUAL STUDY IN TEACHING: An opportunity for students (independently or in a small group) to investigate in depth a topic that usually is unaddressed in existing coursework. (With approval of advisor) 1-4 qtr. hrs.

EDT 646. TOPICS IN TEACHING: Issues of current national or regional interest to teachers (i.e. accountability, testing of teachers, etc.) are studied. 1-4 qtr. hrs.

***EDT 647. SPECIAL TOPICS IN FAMILY AND SCHOOL:** Presentation and evaluation of methods of improving the communication between the home and school. 2-4 qtr. hrs.

***EDT 648. TECHNIQUES IN HOSPITAL INSTRUCTION:** Planning, instructional methods (i.e., formal classes, clinical work, on-the-job training), materials, and evaluation techniques for providing instruction to adult learners in hospitals and other allied health facilities. *1-4 qtr. hrs.*

***EDT 650. CURRENT INNOVATIONS IN EDUCATION:** Presentation examination, and evaluation of recent trends in curriculum and instruction in elementary and secondary schools. *4 qtr. hrs.*

***EDT 654. TEACHING IN CATHOLIC SCHOOLS:** Study of aims, rationale, and curriculum methodologies in light of Catholic theology and philosophy. *3 qtr. hrs.*

***EDT 664. SUPERVISION OF STUDENT TEACHING:** Demonstration of procedures and use of instruments to determine and guide the student teacher's progress. *3 qtr. hrs.*

EDT 670. MASTER'S PROJECT: The culminating course in the Teacher Education Program. Individually or with a small group of students, the student undertakes a demonstration, evaluation, or research project in the

area of the student's concentration. An individual full-time faculty member in the Department of Teacher Education acts as advisor. EDT 500, 502, 503 and at least three-fourths of concentration courses need to have been completed prior to registration for EDT 670. See Department of Teacher Education's Master's Project Handbook for more information. *5 qtr. hrs.*

EDT 682. MUSIC AND ART IN THE ELEMENTARY SCHOOL: A study of instructional content, materials, planning, and assessment for music and art in the elementary school classroom. *3 qtr. hrs.*

EDT 691. LANGUAGE DEVELOPMENT: Study of language development in children with implications for the special-needs learner including alternative communication modes, sign language, communication boards, and augmentative devices. Clinical experience (10 hrs.). Prerequisite: 590 or 591. *3 qtr. hrs.*

EDT 803. RESEARCH: A research course for students in the Educational Specialist program. Prerequisite: EDT 503. *3 qtr. hrs.*

EDT 808. IDEAS THAT SHAPE AMERICAN EDUCATION: This course's major purpose is to provide students the historical bases for policy decisions. The primary expectation is that students learn to use the history of education as a foundation for policy making. *4 qtr. hrs.*

EDT 912. THE CULTURE OF THE SCHOOL: Examination of the school culture and an analysis of how social, political, and environmental influences affect student behavior and teacher and administrator practices. *4 qtr. hrs.*

EDT 913. HISTORY OF EDUCATIONAL ADMINISTRATION: An historical introduction to the development of educational administration as a profession; emphasis is placed on the development of the knowledge base and its applicability to leaders who choose to be scholar-practitioners. The course is designed to inculcate the habit of reflection in those who would be educational leaders. *3 qtr. hrs.*

X SCHOOL OF ENGINEERING

Joseph Lestingi, Dean
Donald Moon, Interim Associate Dean

The School of Engineering offers programs leading to master's and doctor's degrees in various areas of engineering. These graduate programs permit both departmental and interdisciplinary study to meet the specialized and continuing educational needs of the engineer. Sufficient flexibility allows the student to specialize or to pursue a broad field of study. Current graduate programs in the School of Engineering lead to the following degrees:

- Master of Science in Aerospace Engineering
- Master of Science in Chemical Engineering
- Master of Science in Civil Engineering
- Master of Science in Electrical Engineering
- Master of Science in Electro-Optics
- Master of Science in Engineering Management
- Master of Science in Engineering Mechanics
- Master of Science in Materials Engineering
- Master of Science in Mechanical Engineering
- Master of Science in Management Science

- Doctor of Engineering
 - Major in Aerospace Engineering
 - Major in Electrical Engineering
 - Major in Materials Engineering
 - Major in Mechanical Engineering

- Doctor of Philosophy in Engineering
 - Major in Aerospace Engineering
 - Major in Electrical Engineering
 - Major in Materials Engineering
 - Major in Mechanical Engineering
- Doctor of Philosophy in Electro-Optics

Programs and the courses appropriate to each of these degrees are described later in this chapter under subject designations, which are alphabetical.

ASSISTANTSHIPS AND FELLOWSHIPS

Assistantships and fellowships are available at the University of Dayton for the encouragement of graduate work and the promotion of research. These are administered by the academic departments. Detailed information relative to application may be secured from the director of graduate engineering studies.

MASTER'S DEGREE REGULATIONS

Admission Requirements

To be considered for admission to graduate study in the School of Engineering a student must have received an undergraduate degree with emphasis in engineering, physics, chemistry, or applied mathematics. Part of the normal qualification for regular admission is graduation from an accredited engineering curriculum with 3.0 or better cumulative grade point average based on a 4.0 grading system. Those with lower grade point averages will be considered for acceptance on a probationary status, in which case particular attention will be given to the last 60 semester hours of their undergraduate programs, to recommendations, and to engineering experience. They may also be required to take a limited amount of undergraduate work. Students who have degrees in physics, chemistry, applied mathematics, or related sciences are encouraged to apply, but they too may be required to take a limited amount of undergraduate work to complete their preparation for graduate study in the School of

Engineering. Students are expected to have some competence in computer programming and the engineering sciences, and to be familiar with the engineering design process. In addition, there may be special departmental requirements. The minimum mathematics requirement for admission is three semester hours in differential equations.

Unclassified Status

Students may also be accepted in unclassified graduate status. They will be considered as students of the School of Engineering who have not been admitted to a graduate degree program. A student can transfer a maximum of only two courses taken in this status to a program of study for a degree without pre-enrollment approval from the director of graduate engineering. An unclassified student planning to seek a degree should complete an application for graduate study to ensure that the courses taken are acceptable and compatible with degree requirements.

Advising

Each candidate for the master's degree shall be assigned to an advisor by the departmental chair or the program director. The advisor shall be agreed upon by the student and approved by the director of graduate engineering. The duties of the advisor are to assist the student in the preparation of a plan of study and to advise the student during graduate work. An advisor should be appointed prior to initial registration for graduate studies but no later than the end of the first semester. A change of advisor at a later date is permissible upon the request of the student and approval of the departmental chair or program director and the director of graduate engineering.

PROGRAM REQUIREMENTS Plan of Study

The individual plan of study for the degree shall include the specific courses the student is expected to complete and reflect all other requirements of the particular master's degree being sought. The plan of study must be filed with the director of Graduate Engineering & Research prior to the pre-enrollment date for the 16th graduate semester hour. All copies must be approved by the advisor, the program director, and the director of Graduate Engineering & Research.

Thesis

Each student whose plan of study requires a thesis must prepare it in accordance with the general format outlines in the *A Manual for the Preparation of Graduate Theses and Dissertations*, copies of which are available in the Office for Graduate Applications & Records, 117 St. Mary's Hall and from the Office of Graduate Studies and Research, 200 St. Mary's Hall. In general, the thesis will be based on work accomplished in research in the primary area of study. Joint authorship is not permitted. A regular grade will be assigned upon satisfactory completion of the thesis and will be included in the final cumulative grade point average.

Oral and Written Examinations

A final examination is required at the completion of the thesis. The examination may be oral or written or both. It must be given by a committee of no fewer than three. A student who fails to pass it cannot be given another examination in the same semester. No student shall be allowed to take the examination more than three times.

Academic Standards

Graduate students are expected to do high-caliber work at all times and to demonstrate continuing progress toward the degree, which requires that students maintain a minimum average

grade of B (3.0) in course work with no more than two grades of C permitted. Students who fail to meet these requirements are either placed on academic probation or dismissed from the program.

FIVE-YEAR MASTER'S PROGRAM

Undergraduate students who have shown above-average scholastic performance during their first three years of undergraduate work are eligible to pursue the five-year master's program. This program allows the senior engineering student the opportunity of taking selected graduate courses, making it possible to complete the requirements for a master's degree with only two semesters of additional work beyond the bachelor's degree. Undergraduate students who are interested in this program should contact their department chair during the last semester of their junior year.

DOCTOR'S DEGREE REGULATIONS

The School of Engineering offers programs leading to three degrees at the doctoral level, the Doctor of Philosophy (Ph.D.) in Engineering, the Doctor of Philosophy in Electro-Optics and the Doctor of Engineering. The programs are restricted to those who have demonstrated superior abilities in scholarship and research. The Doctor of Philosophy in Engineering and the Doctor of Philosophy in Electro-Optics are granted in recognition of high achievement in scholarship and independent research. Graduate programs leading to the Ph.D. degree currently encompass major fields of study in Aerospace, Electrical, Electro-Optics, Materials, and Mechanical Engineering. The Doctor of Engineering (D.E.) granted in recognition of high achievement in scholarship and superior ability to apply the fundamentals of Engineering to the solution of technical problems, is comparable in rigor to the Ph.D. It requires a broad program of course work, a year of internship in Engineering, and a

practice-oriented dissertation. These last two can be accomplished at the same time. The areas of concentration for the D.E. are Aerospace, Electrical, Materials, and Mechanical Engineering with major support from Chemical Engineering, Civil Engineering, Engineering Mechanics, and Engineering Management. Interdisciplinary study and applied research activities are required.

PROGRAM REQUIREMENTS FOR THE Ph.D. AND D.E. DEGREES

Semester-Hour Requirements

The minimum time required for the Ph.D. or D.E. degree is six semesters of full-time graduate study (a minimum of 90 semester hours) beyond the bachelor's degree, or four semesters of full-time graduate study (a minimum of 60 semester hours) beyond the master's degree. This includes the credit for the doctoral dissertation *with either degree* (a minimum of 30 semester hours). Registration for the dissertation hours is the same as for other courses; however, only those students who have passed the candidacy examination are eligible. A minimum of 48 semester hours must be taken at this university. Also, a minimum of 12 semester hours in graduate mathematics beyond the bachelor's degree is required for both doctoral degrees. The following specific requirements may also apply:

For the Ph.D., a student must complete a minimum of 30 semester hours excluding the dissertation credit, in the major area of study beyond the bachelor's degree.

For the D. E., a student is required to have a major and minor area of study. The minor must be in an area outside the major field. A minimum of 21 semester hours in the major and 12 semester hours in the minor is required beyond the bachelor's degree.

For either degree, the student must satisfactorily complete a specified number of semester hours of course work with a 3.0 or better cumulative grade point average (based on a 4.0 grading system). However, a grade of "F" in any individual course may be

grounds for dismissal from the program. The student must also:

- (1) pass the candidacy examination,
- (2) meet the period of concentrated study requirements,
- (3) complete an acceptable dissertation,
- (4) complete the tools of research requirement,
- (5) demonstrate the ability to accomplish independent study,
- (6) pass a final examination, and
- (7) complete other requirements as specified by the advisory committee and the Office of Graduate Engineering and Research.

Admission

Admission means only that the student will be permitted to enroll for graduate courses. It does not necessarily imply that the student will be admitted to a program leading to a doctor's degree or will be able to achieve the Ph.D. or the D.E.

Normally, a student must earn a master's degree in engineering or science before being granted permission to continue graduate work for the doctorate. Outstanding students, however, may be permitted to work for either doctoral degree directly without the master's degree.

Notice of Intention

Before taking additional courses after completing the requirements for a master's degree or equivalent graduate hours, a student who expects to work to the Ph.D. or D.E. is required to file a "Notice of Intention" in the Office of Graduate Engineering & Research. Unless this is accomplished, the courses taken beyond the master's degree requirement may not be accepted toward a doctoral degree. The Notice of Intention must be filed prior to mid-term of the first semester of enrollment. The proper form may be obtained in the office of Graduate Engineering & Research.

Temporary Advisor

After receipt of the notice of inten-

tion of a student to become a candidate for either the Ph.D. or the D.E., and upon recommendation of the program director, the director of Graduate Engineering & Research will designate a member of the graduate faculty to serve as temporary advisor to the student and assist in the initial selection of courses for the first semester of enrollment.

Qualifying Examination

After the completion of the master's degree or 30 semester hours of graduate study, the student will take a qualifying examination (which may be waived for the exceptional student). The purpose of the examination is to determine the student's qualifications to continue graduate study and to assist the advisory committee in planning the program of study. The examination shall be written and oral. It shall test the student's mastery of the subject matter of graduate courses taken and the student's ability to conduct research, to reason, and to integrate and express knowledge. The student is required to provide evidence of personal research accomplishments (e.g., thesis, research projects, science and engineering technical reports) as part of the examination. The temporary advisor will be responsible for administering the qualifying examination.

Advisory Committee

Before the end of the first semester, the student should consult with the program director and select a major professor to serve as the chair of the advisory committee and to direct the research. The chair will be a member of the School of Engineering graduate faculty. An advisory committee of at least three graduate faculty members from the School of Engineering will then be recommended for approval to the director of graduate engineering. The composition of the committee will generally reflect the student's area of course study and research interest. At least one person having graduate faculty status will be appointed by the director of Graduate Engineering & Research. The duties of the advisory

committee shall consist of (1) advising the student, (2) assisting the student in preparing the complete program of study, (3) preparing and administering the candidacy examination, (4) assisting in planning and conducting research, (5) approving the dissertation, and (6) conducting and reporting the results of the final examination.

Appointment of additional members of the committee from outside the School of Engineering (i.e., other university faculty, adjunct professors, prominent researchers in industry or government) is encouraged. The majority of the committee, however, must be members of the School of Engineering graduate faculty. A dissertation advisor other than the chair may be appointed by the advisory committee.

Plan of Study

The plan of study shall include all the graduate work the student is expected to complete as determined by the advisory committee. The plan of study is to be submitted to the office of Graduate Engineering & Research before the end of the first semester or prior to the pre-enrollment date for the 16th graduate hour beyond the master's degree or its equivalent. The plan shall include the specific courses and all other requirements (seminars, tools of research, research, etc.) which the student is expected to complete, indicating the time and manner in which these requirements are to be met.

Tools of Research

The needs of the student may differ with the educational objectives chosen. Therefore, the tools of research requirement will be determined by the advisory committee and approved by the department chair or the program director. One from the following will be selected:

1. Command of one approved language, as evidenced by a satisfactory score on the Graduate Foreign Language Tests (GFLT) in French, German, or Russian.
2. Completion of 6 semester hours of selected and approved 400-

level or higher courses in Computer Science and/or instrumentation measuring techniques with at least a B average.

3. Completion of 6 semester hours of graduate courses in a defined area of Humanities and/or Social Sciences, related to the program of study objectives with the grade of B or higher.

Courses taken in completing the tools of research requirement will not carry credit toward the degree. The method selected in satisfying this requirement is to be listed in the plan of study. This requirement must be satisfied prior to the candidacy examinations.

Period of Concentrated Study

After a student has filed a notice of intention, he/she must complete a period of concentrated study to be considered for the candidacy examination.

This requirement can be met in either of two ways:

1. During three consecutive semesters, the student completes a minimum of 21 semester hours of graduate course work.
2. In any two of three consecutive semesters, the student completes a minimum of 18 semester hours of graduate course work.

Candidacy Examination

The candidacy examination for either the Ph.D. or the D.E. is generally to be taken when most of the course work, as outlined on the approved plan of study, has been completed. Its purpose is to determine the student's eligibility to become a candidate for the doctor's degree. The examination is comprehensive, covering the entire area of the student's graduate study. It will be both written and oral. The oral portion must follow the written portion by a minimum of two weeks. At least three members of the School of Engineering graduate faculty must participate in the preparation and the administering of the examination under the direction of the advisory committee. The director of

graduate engineering has the right to appoint additional members to the examining committee, and must be informed of the date and place of the examinations and the membership of the committee at least two weeks before the examinations are given.

As part of the examination, the student must have completed a proposal outlining in detail the proposed area of dissertation study and research for the Ph.D. or of the applied research dissertation project for the D.E. The proposal should clearly show the review of the literature in the area, the need for and the uniqueness of the research and/or investigation, the general approach to accomplishing the effort, results expected, detailed costs, the laboratories and/or other facilities needed, and a schedule of completion. In addition, the proposal by the candidate for the D.E. will explain the interdisciplinary role of the investigation. The student in either degree program must make a copy of this proposal available to each committee member prior to the written examination.

NOTE: *the University of Dayton is not obligated to provide financial support for the research or investigation.*

The student must pass all parts of the examination (proposal, written examination, and oral examination) to be admitted to candidacy. The student is considered to have passed only when the decision of the examining committee is unanimous. All members must sign the examination report form with an indication of their decision noted prior to its being submitted to the director of graduate engineering. If any part of the examination is failed, the student will be notified in writing of the conditions for another examination. No student will be permitted to take any part of the examination more than twice. A second examination may not be given earlier than four months after failure. Examinations will be retained by the chair of the advisory committee.

A student must be admitted to candidacy at least six months prior to receiving the doctor's degree.

Internship for D.E. Degree

The D.E. internship is a minimum of one year of high-level practicing engineering experience, and is normally conducted after the student has passed the candidacy examination. The internship phase of the program must be fully described in the proposal submitted as part of the candidacy examination. The candidate's internship advisor (generally the supervisor at the student's interning organization) will be added as a member of the advisory committee. The internship, as part of the D.E. program of study, must be approved by the candidate's advisory committee, program director, and the director of graduate engineering. From 15 to 21 semester hours can be credited for the internship as part of the dissertation requirement for the Doctor of Engineering.

Dissertation

A dissertation is required of each doctoral candidate who has passed the candidacy examination. The dissertation topic will be determined by the student in consultation with the advisor and approved by the advisory committee, the program director, and the director of graduate engineering. The Ph. D. dissertation presents the results of the student's research investigation. It is expected to make an original contribution to technical knowledge, be of sufficient importance to merit publication, and result in a manuscript suitable for submission to an appropriate journal. The D. E. dissertation presents the results of an original investigation as applied to engineering practice. Normally, this will be related directly to the candidate's internship or problems relating to engineering experience or work. It must be a significant contribution of independent engineering work to merit a doctoral level publication. A manuscript in suitable form for submission to an appropriate journal must be submitted to the graduate school of engineering along with the dissertation.

The dissertation will be prepared in accordance with instructions outlined in *A Manual for the Preparation of*

Graduate Theses and Dissertations, copies of which are available in the Graduate Engineering and Research office.

The first draft of the dissertation should be in the hands of the advisor a minimum of six weeks before the end of the semester in which the degree is sought. Four copies of the dissertation in final form, the dissertation, the journal manuscript, and an abstract not to exceed 350 words must be submitted to the Graduate Engineering & Research office at least three weeks before the end of the semester in which the degree is sought. These copies must bear the written approval of the advisor. The original copy of the dissertation and two copies of the abstract shall be filed in the Roesch Library one week prior to the end of the semester.

All doctoral dissertations are microfilmed by University Microfilms, Inc., Ann Arbor, Michigan. The candidate must sign an agreement with University Microfilms, Inc., which authorizes this firm to sell copies of the dissertation. Microfilmed dissertations may be copyrighted by the candidate. Fees will be assessed for the cost of copyrights.

The student must obtain approval from his advisory committee to undertake all or part of his dissertation in absentia. A report requesting this permission must be submitted to the director of graduate engineering outlining in detail the relationship between the advisor and the candidate and the name and background of the person who will directly advise the candidate during the accomplishment of this independent research. This person will be added to the advisory committee.

Candidates must be registered for a minimum of two semester hours every semester during their candidacy including the semester in which the final examination is taken.

Final Examination

After the dissertation has been accepted by the Graduate Engineering and Research office, but no earlier than

six months after the successful candidacy examination, the candidate shall take a final oral examination to demonstrate to the examining committee that all the capabilities for which the doctor's degree is awarded have been met. This is primarily the defense of the dissertation, though it need not be confined exclusively to it. The examination is open to all members of the University of Dayton faculty and student body. At least ten days prior to the date of the examination, the candidate must have provided the committee with copies of the dissertation in final form and must have disseminated an announcement of the final examination to interested organizations.

The final examining committee normally includes the members of the candidate's advisory committee, with the advisor acting as chair. The final examining committee shall consist of at least four members of the graduate faculty, at least one of whom is not directly involved in the program concerned and is appointed by the director of graduate engineering. The director of graduate engineering reserves the right to appoint additional committee members and must be informed of the place and time of the final examination at least ten days in advance.

After the examination, the committee will report its decision to the director of Graduate Engineering & Research. To be satisfactory, the report of the examining committee must be unanimous and must be signed by all members. If the candidate fails by only one vote, the case will be referred to the graduate study committee for appropriate action.

Time Limit

Students are expected to complete the requirements for the doctor's degree within five years after the candidacy examination has been passed. Failure to complete the requirements means that admission to candidacy will be cancelled.

AEROSPACE ENGINEERING (AEE)

Franklin E. Eastep, Program Director

Aerospace Engineering is a major concentration for both the Doctor of Philosophy in Engineering and the Doctor of Engineering. See Doctor's Degree Regulations in the introductory section of this chapter and consult with the program director.

PROGRAM REQUIREMENTS

The program of study leading to the Master of Science in Aerospace Engineering must include a minimum of 30 semester hours of credit consisting of the following:

1. Twelve semester hours in the major area. Major areas of study include Aerodynamics, Aircraft Propulsion, Aircraft Structures, and Flight Vehicle Dynamics.
2. Twelve semester hours of core electives. Core electives will be selected from current course offerings which best satisfy the student's requirements and meet with the advisor's approval. At least one mathematics course is strongly recommended.
3. Six semester hours of research leading to a master's thesis. Research may be replaced by 6 semester hours of additional course work with the approval of the advisor and the program director.

See also Master's Degree Regulations in the introductory section of this chapter and consult with the advisor.

COURSES OF INSTRUCTION

AEE 500. INTRODUCTION TO NUMERICAL METHODS: Numerical analysis topics include the solution of systems of linear and nonlinear algebraic equations; matrix eigenvalue problems; ordinary differential equations; optimization techniques; numeri-

cal integration and interpolation. Engineering applications presented. Computer programming required. *3 sem. hrs.*

AEE 501. ADVANCED AERODYNAMICS I: Fundamentals of aerodynamics including viscosity and compressibility phenomena for subsonic, supersonic, and transonic flow. Emphasis on force and moment determination for bodies, including theory of lift. *3 sem. hrs.*

AEE 502. ADVANCED AERODYNAMICS II: Advanced analytical development of compressible aerodynamics as applied to lifting surfaces and slender bodies. Approximations to lifting surface theory and numerical solution. Introduction to unsteady aerodynamics. Prerequisite: AEE 501. *3 sem. hrs.*

AEE 503. INTRODUCTION TO CONTINUUM MECHANICS: Tensors, calculus of variations, Lagrangian and Eulerian descriptions of motion. General equations of continuum mechanics, constitutive equations of mechanics, thermodynamics of continua. Specialization to cases of solid and fluid mechanics. Prerequisite: EGM 303. *3 sem. hrs.*

AEE 504. FUNDAMENTALS OF FLUID MECHANICS: An advanced course in fluid mechanics with emphasis on the derivation of conservation equations and the application of constitutive theory. Navier-Stokes equations. Ideal fluid approximation. Exact and approximate solutions to classical viscous and inviscid problems. Compressible and incompressible flows. Co-requisite: MEE/AEE 503. *3 sem. hrs.*

AEE 506. MECHANICAL BEHAVIOR OF MATERIALS: Description of the state of stress and strain in materials, plastic deformation, fatigue, fracture, creep, and rupture. Prerequisite: EGM 303 or consent of instructor. *3 sem. hrs.*

AEE 507. ORBITAL DYNAMICS: Solution of the two-body problem; coordinate systems; time measurement; orbital elements. Basic orbital maneu-

vers; transfers; rendezvous; ground-tracks. Methods of orbit determination. Restricted three-body problem and introduction to artificial satellite theory. Prerequisite: MTH 219 and EGM 202 or equivalent. *3 sem. hrs.*

AEE 508. AIRCRAFT PERFORMANCE AND CONTROL: Elementary development of aircraft equations of motion; performance in level flight; climbing and descending performance; turning performance; takeoff and landing performance; static stability and control in all three axes. Prerequisite: AEE 501. *3 sem. hrs.*

AEE 510. INTRODUCTION TO THE FINITE ELEMENT METHOD: Introductory development of the Finite Element Method (FEM), and solution of one- and two-dimensional field problems from fluid, solid, and thermal mechanics. Principles of virtual work and Hamilton; approximate methods; description of stiffness, nodal force, and mass matrices; matrix assembly procedures. Course emphasis on a broad understanding of FEM theory and applications. Not open to structures majors. Prerequisite: EGM 303. *3 sem. hrs.*

AEE 513. PROPULSION: Principles of propulsive devices, aerothermodynamics diffuser and nozzle flow, energy transfer in turbo-machinery, turbojet, turbo-fan, prop-fan engines, turbo-prop and turboshaft engines. RAM and SCRAM jet analysis and a brief introduction to related materials and air frame-propulsion interaction. Prerequisite: MEE 418. *3 sem. hrs.*

AEE 515. CONDUCTION HEAT TRANSFER: Steady state and transient state conduction. Evaluation of temperature fields by formal mathematics, numerical analysis. Emphasis on approximate solution techniques. *3 sem. hrs.*

AEE 516. CONVECTION HEAT AND MASS TRANSFER: Development of governing differential equations for convection. Methods of solution including similarity methods, integral methods, superposition of solutions, eigenvalue problems.

Turbulent flow convection; integral methods, eddy diffusivities for heat and momentum. Extensions to mass transfer. Prerequisite: MEE 410. *3 sem. hrs.*

AEE 517. RADIATION HEAT TRANSFER: Fundamental relationships of radiation heat transfer. Radiation characteristics of surfaces. Geometric considerations in radiation exchange between surfaces. Emissivity and absorptivity of gases. Introduction to radiative exchange in gases. *3 sem. hrs.*

AEE 519. ANALYTICAL DYNAMICS: Dynamical analysis of a system of particles and of rigid bodies. Lagrangian and Hamiltonian formulation of equations of motion; classical integrals of motion. Stability analysis of linear and nonlinear systems. Prerequisite: MTH 219 and EGM 202 or equivalent. *3 sem. hrs.*

AEE 521. FLIGHT VEHICLE DYNAMICS: Dynamics of flight vehicles that emphasize the fundamental theory of flight and its application to aerospace systems. Static and dynamic stability including the characteristic longitudinal and lateral perturbation motions about the equilibrium state. Prerequisite: AEE 501. *3 sem. hrs.*

AEE 527. AUTOMATIC CONTROL THEORY: Stability and performance of automatic control systems. Classical methods of analysis including transfer functions, time-domain solutions, root locus and frequency response methods. Modern control theory techniques including state variable analysis, transformation to companion forms, controllability, pole placement, observability and observer systems. Prerequisite: ELE 432 or MEE 435 or equivalent. *3 sem. hrs.*

AEE 528. OPTIMAL FLIGHT TRAJECTORIES: Relative and global optimization of single and multiple variables; constrained optimization; steady state methods; energy state approximation; variational methods; numerical techniques; aerospace applications. Prerequisite: AEE 508. *3 sem. hrs.*

AEE 532. ACOUSTICS: Physics of sound propagation, psychological effects of noise, noise control criteria and regulations, transmission phenomena, acoustics of walls and enclosures, resonators and filters, acoustic properties of materials, acoustic consideration in structural and machine design. *3 sem. hrs.*

AEE 535. MECHANICAL VIBRATIONS: Review of undamped, damped, natural and forced vibrations of one and two degrees of freedom systems. Lagrange's equation, eigenvalue/eigenvector problem, modal analysis for discrete and continuous systems. Computer application for multi-degree of freedom, nonlinear problems. Prerequisite: Computer Programming and MEE 319. *3 sem. hrs.*

AEE 536. RANDOM VIBRATIONS: Introduction to probability distribution; characterization of random vibrations; harmonic analysis; auto- and cross-correlation and spectral density; coherence; response to single and multiple loadings; Fast Fourier Transform (FFT); applications in vibrations, vehicle dynamics, fatigue, etc. Prerequisites: Computer Programming and MEE 319. *3 sem. hrs.*

AEE 538. INTRODUCTION TO AEROELASTICITY: The study of the effect of aerodynamic forces on a flexible aircraft. Flexibility coefficients and natural modes of vibration. Quasi-steady aerodynamics. Static aeroelastic problems; wing divergence and dynamic aeroelasticity; wing flutter. An introduction to structural stability augmentation with controls. Prerequisites: AEE 501. *3 sem. hrs.*

AEE 541. EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS: Introduction to the mechanical response of fiber-reinforced composite materials with emphasis on the development of experimental methodology. Analytical topics include stress-strain behavior of anisotropic materials, laminate mechanics, and strength analysis. Theoretical models are applied to the analysis of experimental techniques used for characterizing composite materials. Lectures are

supplemented by laboratory sessions in which characterization tests are performed on contemporary composites. Prerequisite: EGM 303. *3 sem. hrs.*

AEE 543. ANALYTICAL MECHANICS OF COMPOSITE MATERIALS: Analytical models are developed for predicting the mechanical and thermal behavior of fiber-reinforced composite materials as a function of constituent material properties. Both continuous and discontinuous fiber-reinforced systems are considered. Specific topics include basic mechanics of anisotropic materials, micromechanics, lamination theory, free-edge effects, and failure criteria. Prerequisite: EGM 303. *3 sem. hrs.*

AEE 544. MECHANICS OF COMPOSITE STRUCTURES: Comprehensive treatment of laminated beams, plates, and sandwich structures. Effect of heterogeneity and anisotropy on bending under lateral loads, buckling, and free vibration are emphasized. Shear deformation and other higher order theories and their range of parametric application are also considered. Prerequisite: MAT 543 or consent of instructor. *3 sem. hrs.*

AEE 545. COMPUTATIONAL METHODS FOR DESIGN: Modeling of mechanical systems and structures, analysis by analytical and numerical methods, development of mechanical design criteria and principles of optimum design, selected topics in mechanical design and analysis, use of the digital computer as an aid in the design of mechanical elements. Prerequisite: Computer Programming. *3 sem. hrs.*

AEE 546. FINITE ELEMENT ANALYSIS I: Fundamental development of the Finite Element Methods (FEM), and solution to field problems and comprehensive structural problems. Variational principles and weak-forms; finite element discretization; shape functions; finite elements for field problems; bar, beam, plate, and shell elements; isoparametric finite elements, stiffness, nodal force, and mass matrices; matrix assembly procedures; computer coding techniques; modeling decisions; program output interpreta-

tion. Course emphasis on a thorough understanding of FEM theory and modeling techniques. Prerequisites: EGM 503 or EGM 533. *3 sem. hrs.*

AEE 547. FINITE ELEMENT ANALYSIS II: Advanced topics: heat transfer; transient dynamics; nonlinear analysis; substructuring and static condensation; effects of inexact numerical integration and element incompatibility; patch test; frontal solution techniques; selected topics from the recent literature. Prerequisite: AEE 546. *3 sem. hrs.*

AEE 551. VISCOUS FLOW; Fundamentals of fluid mechanics with emphasis on the derivation of conservation equations and the application of constitutive theory. Navier-Stokes equations. Exact and approximate solutions to classical viscous flow problems. Introduction to boundary layers. Prerequisite: AEE 503. *3 sem. hrs.*

AEE 552. BOUNDARY LAYERS; Development of the Prandtl boundary layer approximation in two and three dimensions for both compressible and incompressible flow. Exact and approximate solutions for laminar flows. Unsteady boundary layers. Linear stability theory and transition to turbulence. Empirical and semi-empirical methods for turbulent boundary layers. Higher order boundary layer theory. Prerequisite: AEE 504 or equivalent. *3 sem. hrs.*

AEE 553. COMPRESSIBLE FLOW: Fundamental equations of compressible flow. Introduction to flow in two and three dimensions. Two-dimensional supersonic flow, small perturbation theory, method of characteristics, oblique shock theory. Introduction to unsteady one-dimensional motion and shock tube theory. Method of surface singularities. Prerequisite: AEE 504 or equivalent. *3 sem. hrs.*

AEE 554. TRANSONIC AERODYNAMICS: Inviscid theory related to planar flows, axisymmetric flow and shock free solutions. Viscous consideration for compressible boundary layers and flow separation and reattachment. Numerical methods of relaxation time

dependent, gradient dependent and integral solutions. Consideration, limitation and correlation of wind tunnel and flight testing. Design of supercritical wings. Prerequisite: AEE 504. *3 sem. hrs.*

AEE 555. TURBULENCE: Origin, evolution, and dynamics of fully turbulent flows. Description of statistical theory, spectral dynamics, and the energy cascade. Characteristics of wall-bounded and free turbulent shear flows. Reynolds stress models. Prerequisite: AEE 504 or equivalent. *3 sem. hrs.*

AEE 556. HYPERSONIC AERODYNAMICS: Hypersonic prediction techniques, similarity rules, Newtonian impact theory, high-temperature equilibrium properties of gases; wake characteristics; heat transfer, chemical kinetics and reacting gas flows, simulation and testing techniques. Prerequisite: AEE 504. *3 sem. hrs.*

AEE 558. COMPUTATIONAL AERODYNAMICS: Numerical solution to Navier-Stokes equations and approximations such as the boundary layer equations for air-flow about a slender body. Numerical techniques for the solution of the transonic small disturbance equations. Numerical determination of fluid instabilities. Prerequisites: AEE 551 or consent of instructor. *3 sem. hrs.*

AEE 565. FUNDAMENTALS OF COMBUSTION: Heat of combustion and flame temperature calculations; rate of chemical reaction and Arrhenius relationship; theory of thermal explosions and concept of ignition delay and critical mass; phenomena associated with hydrocarbon-air combustion; specific applications of combustion. *3 sem. hrs.*

AEE 566. COMBUSTION THEORY: Theory of detonation (Rankine-Hugoniot relationships) and flame propagation rates in pre-mixed gas systems; turbulent flames and the well-stirred reactor; theory of diffusion flames; fuel droplet combustion; steady burning of solid materials; ignition and flame spreading across solid materials. *3 sem. hrs.*

AEE 570. FRACTURE MECHANICS: Application of principles of fracture mechanics to fatigue and fracture in engineering structures. Prerequisite: AEE 506 or consent of instructor. *3 sem. hrs.*

AEE 580. AEROSPACE ENGINEERING PROJECT: Student participation in an aerospace research, design, or development project under the direction of a project advisor. The student must show satisfactory progress as determined by the project advisor and must present a written report at the conclusion of the project. *3-6 sem. hrs.*

AEE 590. SELECTED READINGS IN AEROSPACE ENGINEERING: Directed readings in the designated area to be arranged and approved by the student's advisor and the program director. May be repeated. *1-3 sem. hrs.*

AEE 595. SPECIAL PROBLEMS IN AEROSPACE ENGINEERING: Special assignments in aerospace engineering subject matter to be approved by the student's faculty advisor and the program director. *1-6 sem. hrs.*

AEE 599. THESIS *3-6 sem. hrs.*

AEE 622. ADVANCED VEHICLE DYNAMICS: Advanced topics in vehicle dynamics including the coupling of the elastic degrees of freedom with the rigid body motions. Response to controls, flight in a turbulent atmosphere, human pilots and handling qualities as well as inverse problems. *3 sem. hrs.*

AEE 624. OPTIMAL CONTROL: Review of observability, controllability, and modern linear feedback control. Variational methods for the minimization of functions and functionals. Optimal linear feedback control; regulator, tracking and minimum time problems. Perturbation control and numerical methods for optimal paths. Prerequisite: AEE 527 or equivalent. *3 sem. hrs.*

AEE 628. AIRCRAFT FLIGHT CONTROL: Autopilots, stability augmentation, and flight control system analysis and design. Digital control theory and techniques. Prerequisites: AEE 521 and 527. *3 sem. hrs.*

AEE 690. SELECTED READINGS IN AEROSPACE ENGINEERING: Directed readings in aerospace engineering to be arranged and approved by the student's advisory committee and the program director. May be repeated. *1-3 sem. hrs.*

AEE 695. SPECIAL PROBLEMS IN AEROSPACE ENGINEERING: Special assignments in aerospace engineering. Subject matter to be arranged and approved by the student's advisory committee and the program director. May be repeated. *1-3 sem. hrs.*

AEE 698. D.E. DISSERTATION: An original investigation as applied to aerospace engineering practice. Results must be of sufficient importance to merit publication. *1-15 sem. hrs.*

AEE 699. Ph.D. DISSERTATION: Research in aerospace engineering. Results must be of sufficient importance to merit publication. *1-15 sem. hrs.*

Department of
**CHEMICAL
ENGINEERING
(CME)**

James A. Snide,
Chair of the Department

PROGRAM REQUIREMENTS

The program of study leading to the Master of Science in Chemical Engineering must include a minimum of 30 semester hours of credit consisting of the following:

1. Fifteen semester hours of Chemical Engineering graduate courses, including CME 505 or 507, 521 or 522, 542 or 543, and 581 or 582.
2. Nine semester hours of electives as approved by the advisor and the department chair.

3. Six semester hours on an approved thesis project; a final examination is required at the completion of the thesis. Upon the request of the student and with the approval of the faculty advisor and chair of the department, six hours of additional course work plus three hours of special problem work may be substituted for the thesis.

A final examination is required at the completion of the thesis or course work. See also Master's Degree Regulations in the introductory section of this chapter and consult with the advisor.

COURSES OF INSTRUCTION

CME 505. THERMODYNAMICS OF SOLIDS: Laws of thermodynamics, auxiliary functions, thermodynamic relations, phase transitions, thermodynamic equilibrium, thermodynamic properties of solid solutions, surfaces and interfaces. Prerequisite: MAT 501 or consent of instructor. *3 sem. hrs.*

CME 507. ADVANCED THERMODYNAMICS: Entropy balance. Thermodynamics of energy conversion. Mixtures. Equilibria. Current applications. *3 sem. hrs.*

CME 508. ADVANCED TOPICS IN CHEMICAL ENGINEERING: Study and discussion of current problems in chemical engineering research. Prerequisites: CME 521, 581, or consent of instructor. *3 sem. hrs.*

CME 509. INTRODUCTION TO POLYMER SCIENCE: Introduction to polymers. An overview of the field, including the nature of polymers, polymer production, characterization, and processing. Prerequisites: College chemistry and calculus. *3 sem. hrs.*

CME 510. PHYSICAL PROPERTIES OF POLYMERS: Intensive discussion of the interrelations between molecular and gross physical properties of polymers. Prerequisites: Background in differential equations, organic or physical chemistry, or CME 509. *3 sem. hrs.*

CME 511. PRINCIPLES OF CORROSION: Application of electrochemical principles, corrosion reactions, passivation, cathodic and anodic protection, stress corrosion, and high-temperature oxidation. Prerequisite: MAT 501. *3 sem. hrs.*

CME 515. STATISTICAL THERMODYNAMICS: Microscopic thermodynamics; Boltzmann, Bose-Einstein, Fermi-Dirac statistics; statistical interpretation of thermodynamic quantities. Applications to perfect and real gases, liquids, crystalline solids, and thermal radiation. Prerequisites: CME 305, MTH 219. *3 sem. hrs.*

CME 521. ADVANCED TRANSPORT PHENOMENA: Applications of the principles of momentum, heat and mass transfer to steady state and transient problems. Molecular concepts. Transport in turbulent flow. Boundary layer theory. Numerical applications. Prerequisites: CME 324 and 381 or equivalent. *3 sem. hrs.*

CME 522. ADVANCED TOPICS IN TRANSPORT PHENOMENA: The equations of change for multicomponent systems. Turbulent mass transport. Interphase transport in multicomponent systems. Combustion analysis. Macroscopic balances. Prerequisite: CME 325 and 581 or equivalent. *3 sem. hrs.*

CME 541. PROCESS DYNAMICS: Mathematical modeling and computer simulation of process dynamics and control for chemical engineering processes. *3 sem. hrs.*

CME 542. CHEMICAL ENGINEERING KINETICS: Reaction kinetics. Heterogeneous catalytic reactions. Transport processes with fluid-solid heterogeneous reactions. Noncatalytic gas-solid reactions. Catalyst deactivation. Gas-liquid reactions. Prerequisites: CME 406 and 381 or equivalent. *3 sem. hrs.*

CME 543. CHEMICAL REACTOR ANALYSIS AND DESIGN: Design for optimum selectivity. Stability and transient behavior of the mixed flow reactor. Nonideal flow and balance models. Fixed and fluidized bed reactors. Multiphase flow reactors.

Prerequisites: CME 406 and 381 or equivalent. *3 sem. hrs.*

CME 581. ADVANCED CHEMICAL ENGINEERING CALCULATIONS I: Applications of ordinary and partial differential equations to engineering problems. Classical methods of solution. *3 sem. hrs.*

CME 582. ADVANCED CHEMICAL ENGINEERING CALCULATIONS II: Analyses and solutions of engineering problems described by differential equations. Numerical methods of solution. *3 sem. hrs.*

CME 583. PROCESS MODELING: Mathematical description of physical and chemical processes, solution methods, and prediction interpretation. Engineering applications. Prerequisite: CME 582 or equivalent. *3 sem. hrs.*

CME 595. SPECIAL PROBLEMS IN CHEMICAL ENGINEERING: Particular assignments to be arranged and approved by the chair of the department. *1-6 sem. hrs.*

CME 599. THESIS *3-6 sem. hrs.*

Department of CIVIL AND ENVIRONMENTAL ENGINEERING (CIE)

Fred K. Bogner,
Chair of the Department

PROGRAM REQUIREMENTS

The program of study for the degree of Master of Science in Civil Engineering, developed in cooperation with an advisor assigned by the department chair, must include a minimum of 30 semester hours consisting of the following:

1. Fifteen to eighteen semester hours in Civil Engineering, Engineering Mechanics, and/or thesis-related courses selected from one of the following areas of concentration:

- Engineering Mechanics
 - Environmental Engineering
 - Soil Mechanics
 - Structural Engineering
 - Transportation Engineering
2. Six to nine semester hours of engineering or basic science electives to be chosen from current course offerings. For the major concentration of Engineering Mechanics, six semester hours of mathematics (MTH 535 and 551) must be selected.
 3. Six semester hours of research on a Civil Engineering or Engineering Mechanics thesis (CIE 599, EGM 599). A final oral thesis defense is required upon completion of the thesis. Upon the request of the student, and with the approval of the faculty advisor and the department chair, this requirement may be replaced by nine additional semester hours of coursework. At least three of the additional hours must be Special Problems (CIE 595, EGM 595).

See also Master's Degree Regulations in the introductory section of this chapter and consult with the advisor.

COURSES OF INSTRUCTION

CIE 500. ADVANCED STRUCTURAL ANALYSIS: Frames of variable cross section; arches; flat and folded plates; elastic stability of columns, frames, and plates; cylindrical, spherical, and barrel shells; structural dynamics of beams and frames. Prerequisites: CIE 317. *3 sem. hrs.*

CIE 501. STRUCTURAL ANALYSIS BY COMPUTER: Review of force and displacement methods. Introduction to direct element and substructure methods. Students write and execute computer programs to analyze plane and space trusses, grids, and frames. Prerequisite: CIE 317. *3 sem. hrs.*

CIE 502. PRESTRESSED CONCRETE: Discussion of the properties of concrete and prestressing steel. Theory and design of prestressed concrete beams, slabs, columns, frames, ties, and circular tanks. Prerequisite: CIE 412. *3 sem. hrs.*

CIE 503. INTRODUCTION TO CONTINUUM MECHANICS: Tensors, calculus of variations, Lagrangian and Eulerian descriptions of motion. General equations of continuum mechanics, constitutive equations of mechanics, thermodynamics of continua. Specialization to cases of solid and fluid mechanics. Prerequisite: EGM 303. *3 sem. hrs.*

CIE 504. STRUCTURAL DYNAMICS: Response of undamped and damped single and multidegree-of-freedom structures subjected to harmonic, periodic, and general dynamic loadings. Special topics include nonlinear structural response, response spectra, shear buildings, and simple systems with distributed properties. Prerequisites: EGM 303, CIE 317 or permission. *3 sem. hrs.*

CIE 505. PLASTIC DESIGN IN STEEL: Analysis and design procedures based on ultimate load capacity applied to steel beams, frames, and their connections. Concept of plastic hinge, necessary conditions for the existence of plastic moment, instability, deformations, repeated and reversed loading, and minimum weight design. Prerequisite: CIE 411. *3 sem. hrs.*

CIE 507. MASONRY DESIGN: Properties and performance criteria of bricks, concrete blocks, mortar and grout; codes and construction practices; design of masonry elements. Prerequisite: CIE 317. *3 sem. hrs.*

CIE 511. EXPERIMENTAL STRESS ANALYSIS: A study of the experimental analysis of stress as an aid to design for strength and economy with emphasis on electrical strain gages. Also, photoelasticity, brittle coatings, analogies, structural similitude. Two hours lecture and one three-hour laboratory period per week. Prerequisite: EGM 303. *3 sem. hrs.*

CIE 520. ADVANCED SOIL MECHANICS: Treatment of the theories of conventional soil mechanics. Detailed study and analysis of the static and dynamic properties of soils, with applications to foundation behavior. Prerequisite: CIE 312. *3 sem. hrs.*

CIE 524. FOUNDATION DESIGN: Analysis of earth pressure, stability of natural slopes, and bearing capacity of soil; design of spread foundations, pile foundations, beams on elastic foundations, anchored bulkheads, caissons, and cofferdams. Prerequisite: CIE 312. *3 sem. hrs.*

CIE 533. THEORY OF ELASTICITY: Three-dimensional stress and strain at a point; equations of elasticity in Cartesian and curvilinear coordinates; methods of formulation of equations for solution; plane stress and plane strain; energy formulations; numerical solution procedures. Corequisite: EGM 503. Prerequisite: EGM 303. *3 sem. hrs.*

CIE 534. THEORY OF PLATES AND SHELLS: Theory of plates: small and large displacement theories of thin plates; shear deformation; buckling; sandwich plate theory. Thin shell theory: theory of surfaces; thin shell equations in orthogonal curvilinear coordinates; bending, membrane, and shallow shell theories. Prerequisite: EGM 533. *3 sem. hrs.*

CIE 535. ADVANCED MECHANICAL VIBRATIONS: Review of undamped, damped, natural, and forced vibrations of one and two degrees of freedom systems. Lagrange's equation, eigenvalue/eigenvector problem, modal analysis for discrete and continuous systems. Computer application for multi-degree of freedom, nonlinear problems. Prerequisites: Computer Programming and MEE 319. *3 sem. hrs.*

CIE 539. THEORY OF PLASTICITY: Fundamentals of plasticity theory including elastic, viscoelastic, and elastic-plastic constitutive models; plastic deformation on the macroscopic and microscopic levels; stress-strain relations in the plastic regime; strain hardening; limit analysis; numerical procedures. Prerequisite: EGM 503 or 533. *3 sem. hrs.*

CIE 540. HIGHWAY GEOMETRIC DESIGN: Design controls and criteria, vehicle capacity, sight distance, intersection and interchange design. Prerequisite: CIE 403. *3 sem. hrs.*

CIE 544. TRAFFIC ENGINEERING: Characteristics of traffic, including the road user, the vehicle, origin, and destination surveys; traffic regulation, control devices and aids, design, administration, and planning. Prerequisite: CIE 403. *3 sem. hrs.*

CIE 546. FINITE ELEMENT ANALYSIS I: Fundamental development of the Finite Element Method (FEM), and solution of field problems and comprehensive structural problems. Variational principles and weak-forms; finite element discretization; shape functions; finite elements for field problems; bar, beam, plate, and shell elements; isoparametric finite elements, stiffness, nodal force, and mass matrices; matrix assembly procedures; computer coding techniques; modeling decisions; program output interpretation. Course emphasis on a thorough understanding of FEM theory and modeling techniques. Prerequisites: CIE 513 or 533. *3 sem. hrs.*

CIE 558. TRAFFIC ENGINEERING RESEARCH: Problems in control or capacity restraints based on studies of local situations. *3 sem. hrs.*

CIE 560. ADVANCED SANITARY ENGINEERING: Stream pollution control and design of water and waste treatment plants and sewers. Prerequisites: CIE 333, 434. *3 sem. hrs.*

CIE 562. INDUSTRIAL WASTE TREATMENT: Nature and quality of specific industrial wastes and water supplies, treatment and disposal of industrial wastes. Prerequisites: CIE 333, 434. *3 sem. hrs.*

CIE 563. HAZARDOUS WASTE TREATMENT: Introduction to the principles of operation of technologies used for treatment of hazardous wastes and remediation of contaminated sites.

Prerequisite: Advanced standing in an engineering or science major. *3 sem. hrs.*

CIE 564. SOLID WASTE MANAGEMENT ENGINEERING: Solid Waste description, storage/collection, disposal practice, recycling, incineration and resource recovery. Waste processing system and plant designs. *3 sem. hrs.*

CIE 565. SANITARY CHEMISTRY: Principles, techniques, and interpretations of physical, chemical and biological tests related to water, sewage, and industrial wastes. Prerequisite: CHM 124. *3 sem. hrs.*

CIE 570. CIE COMPUTER APPLICATIONS: Applications of mainframe mini- and micro-computers to the solution of selected Civil Engineering problems, including data analysis, plotting, optimization, and simulation. *3 sem. hrs.*

CIE 580. HYDROLOGY AND SEEPAGE: The deposition, movement, and infiltration of water as related to the hydrologic cycle and groundwater hydraulics; a study of the theory of flow in porous media with application to dams, excavations, and other foundation problems. Prerequisites: CIE 312, 313. *3 sem. hrs.*

CIE 582. ADVANCED HYDRAULICS: Problems and study involving open channel flow, draw down curves, hydraulics of dams, spillway, models, and water distribution systems. Prerequisite: CIE 313. *3 sem. hrs.*

CIE 595. SPECIAL PROBLEMS IN CIVIL ENGINEERING: Special assignments in civil engineering subject matter to be arranged and approved by the student's advisor and the department chair. *2-6 sem. hrs.*

CIE 599. THESIS *3-6 sem. hrs.*

ENGINEERING MECHANICS (EGM)

Fred K. Bogner,
Chair of the Department

PROGRAM REQUIREMENTS

The program of study for the degree of Master of Science in Engineering Mechanics requires a minimum of 33 semester hours of credit consisting of the following:

1. Twelve required semester hours in Engineering Mechanics: EGM 500, 503, 533, and 546.
2. Nine elective semester hours in engineering mechanics.
3. Six required semester hours in Mathematics: MTH 535 and 551.
4. Six semester hours of research on an approved project or thesis. Thesis or project research may be replaced by nine semester hours of additional course work only with the approval of both the advisor and the program director.

See also Master's Degree Regulations in the introductory section of this chapter and consult with the advisor.

COURSES OF INSTRUCTION

EGM 500. INTRODUCTION TO NUMERICAL METHODS: Numerical analysis topics include the solution of systems of linear and non-linear algebraic equations; matrix eigenvalue problems; ordinary differential equations; optimization techniques; numerical integration and interpolation. Engineering applications presented. Computer Programming required. *3 sem. hrs.*

EGM 502. ADVANCED ENGINEERING ANALYSIS: Detailed analysis of engineering problems using laws of nature, fundamental engineering principles, mathematics, computers, and practical experience to construct, resolve and test analytic models of physical events. Emphasis is on the use of the professional engineering

approach which includes formulation of the problem, assumptions, plan or method of attack, solving the problem, checking and generalizing results.

3 sem. hrs.

EGM 503. INTRODUCTION TO CONTINUUM MECHANICS:

Tensors, calculus of variations, Lagrangian and Eulerian descriptions of motion. General equations of continuum mechanics, constitutive equations of mechanics, thermodynamics of continua. Specialization to cases of solid and fluid mechanics. Prerequisite: EGM 303.

3 sem. hrs.

EGM 504. FUNDAMENTALS OF FLUID MECHANICS:

An advanced course in fluid mechanics with emphasis on the derivation of conservation equations and the application of constitutive theory. Navier-Stokes equations. Ideal fluid approximation. Exact and approximate solutions to classical viscous and inviscid problems. Compressible and incompressible flows. Co-requisite: EGM 503.

3 sem. hrs.

EGM 506. MECHANICAL BEHAVIOR OF MATERIALS:

Description of the state of stress and strain in materials, plastic deformation, fatigue, fracture, creep, and rupture. Prerequisites: MEE 503, or consent of instructor.

3 sem. hrs.

EGM 511. EXPERIMENTAL STRESS ANALYSIS:

A study of the experimental analysis of stress as an aid to design for strength and economy with emphasis on electrical strain gages. Also, photoelasticity, brittle coatings, analogies, structural similitude. Two hours lecture and one three-hour laboratory period per week.

3 sem. hrs.

EGM 519. ANALYTIC DYNAMICS:

Dynamical analysis of a system of particles and of rigid bodies; Lagrangian and Hamiltonian formulation of equations of motion; classical integrals of motion; stability analysis of linear and nonlinear systems. Prerequisite: MTH 219 and EGM 202 or equivalent.

3 sem. hrs.

EGM 531. THEORY OF LINEAR VISCOELASTICITY:

The principles of viscoelasticity; Kelvin and Maxwell models of viscoelastic materials; creep and relaxation phenomena; application of hereditary integral and complex compliance; correspondence principle wave propagation and vibrational response. Prerequisites: MTH 219 and EGM 303.

3 sem. hrs.

EGM 533. THEORY OF ELASTICITY:

Three-dimensional stress and strain at a point; equations of elasticity in Cartesian and curvilinear coordinates; methods of formulation of equations for solution; plane stress and plane strain; energy formulations; numerical solution procedures.

Corequisite: EGM 503. Prerequisite: EGM 303.

3 sem. hrs.

EGM 534. THEORY OF PLATES AND SHELLS:

Theory of plates: small and large displacement theories of thin plates; shear deformation; buckling, sandwich plate theory. Thin shell theory: theory of surfaces; thin shell equations in orthogonal curvilinear coordinates; bending, membrane, and shallow shell theories. Prerequisite: EGM 533.

3 sem. hrs.

EGM 535. ADVANCED MECHANICAL VIBRATIONS:

Review of undamped, damped natural and forced vibrations of one and two degrees of freedom systems. Lagrange's equation, eigenvalue/eigenvector problem, modal analysis for discrete and continuous systems. Computer application for multi-degree of freedom, nonlinear problems. Prerequisites: Computer Programming and MEE 319.

3 sem. hrs.

EGM 536. RANDOM VIBRATIONS:

Introduction to probability distribution; characterization of random vibrations; harmonic analysis; auto- and cross-correlation and spectral density; coherence; response to single and multiple loadings; Fast Fourier Transform (FFT); applications in vibrations, vehicle dynamics, fatigue, etc. Prerequisites: Computer Programming and MEE 319.

3 sem. hrs.

EGM 538. INTRODUCTION TO AEROELASTICITY:

The study of the

effect of aerodynamic forces on a flexible aircraft. Flexibility coefficients and natural modes of vibration. Quasi-steady aerodynamics. Static aeroelastic problems; wing divergence and dynamic aeroelasticity; wing flutter. An introduction to structural stability augmentation with controls. Prerequisite: AEE 501 or equivalent.

3 sem. hrs.

EGM 539. THEORY OF PLASTICITY:

Fundamentals of plasticity theory including elastic, viscoelastic, and elastic-plastic constitutive models; plastic deformation on the macroscopic and microscopic levels; stress-strain relations in the plastic regime; strain hardening; limit analysis; numerical procedures. Prerequisite: EGM 503 or 533.

3 sem. hrs.

EGM 541. EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS:

Introduction to the mechanical response of fiber-reinforced composite materials with emphasis on the development of experimental methodology. Analytical topics include stress-strain behavior of anisotropic materials, laminate mechanics, and strength analysis. Theoretical models are applied to the analysis of experimental techniques used for characterizing composite materials. Lectures are supplemented by laboratory sessions in which characterization tests are performed on contemporary composite materials. Prerequisite: EGM 303.

3 sem. hrs.

EGM 543. ANALYTICAL MECHANICS OF COMPOSITE MATERIALS:

Analytical models are developed for predicting the mechanical and thermal behavior of fiber-reinforced composites as a function of constituent material properties. Both continuous and discontinuous fiber-reinforced systems are considered. Specific topics include basic mechanics of anisotropic materials, micro-mechanics, and lamination theory, free edge effects, and failure criteria. Prerequisite: EGM 303.

3 sem. hrs.

EGM 544. MECHANICS OF COMPOSITE STRUCTURES:

Comprehensive treatment of laminated beams, plates, and sandwich structures. Effect of heterogeneity and anisotropy on

bending under lateral loads, buckling, and free vibration are emphasized. Shear deformation and other higher-order theories and their range of parametric application are also considered. Prerequisite: EGM 543 or consent of instructor. *3 sem. hrs.*

EGM 545. COMPUTATIONAL METHODS FOR DESIGN: Modeling of mechanical systems and structures, analysis by analytical and numerical methods, development of mechanical design criteria and principles of optimum design, selected topics in mechanical design and analysis, use of the digital computer as an aid in the design of mechanical elements. Prerequisite: Computer Programming. *3 sem. hrs.*

EGM 546. FINITE ELEMENT ANALYSIS I: Fundamental development of the Finite Element Method (FEM), and solution of field problems and comprehensive structural problems. Variational principles and weak-forms; finite element discretization; shape functions; finite elements for field problems; bar, beam, plate, and shell elements; isoparametric finite elements; stiffness, nodal force, and mass matrices; matrix assembly procedures; computer coding techniques; modeling decisions; program output interpretation. Course emphasis on a thorough understanding of FEM theory and modeling techniques. Prerequisites: EGM 503 or EGM 533. *3 sem. hrs.*

EGM 547. FINITE ELEMENT ANALYSIS II: Advanced topics: heat transfer; transient dynamics; nonlinear analysis; substructuring and static condensation; effects of inexact numerical integration and element incompatibility; patch test; frontal solution techniques; selected topics from the recent literature. Prerequisite: EGM 546. *3 sem. hrs.*

EGM 548. ENERGY METHODS IN SOLID MECHANICS: Development of fundamental energy principles; virtual displacements, strain energy, Castigliano's theorems, minimum potential energy principles. Applications to engineering problems; redundant structures, buckling, static and dynamic analysis. Prerequisite: EGM 503 or EGM 533. *3 sem. hrs.*

EGM 549. THEORY OF ELASTIC STABILITY: Introduction to stability theory; buckling of plates and shells; influence of initial imperfections; nonlinear analysis; numerical solution methods. Prerequisite: EGM 533. *3 sem. hrs.*

EGM 552. BOUNDARY LAYERS: Development of the Prandtl boundary layer approximation in two and three dimensions for both compressible and incompressible flow. Exact and approximate solutions for laminar flows. Unsteady boundary layers. Linear stability theory and transition to turbulence. Empirical and semi-empirical methods for turbulent boundary layers. Higher-order boundary layer theory. Prerequisite: EGM 504 or equivalent. *3 sem. hrs.*

EGM 553. COMPRESSIBLE FLOW: Fundamental equations of compressible flow. Introduction to flow in two and three dimensions. Two-dimensional supersonic flow, small perturbation theory, method of characteristics, oblique shock theory. Introduction to unsteady one-dimensional motion and shock tube theory. Method of surface singularities. Prerequisite: EGM 503. *3 sem. hrs.*

EGM 570. FRACTURE MECHANICS: Application of principles of fracture mechanics to fatigue and fracture in engineering structures. Prerequisites: EGM 506 or consent of instructor. *3 sem. hrs.*

EGM 590. SELECTED READINGS IN ENGINEERING MECHANICS: Directed readings in a designated area, arranged and approved by the student's faculty advisor and the department chair. May be repeated. *1-3 sem. hrs. each.*

EGM 595. SPECIAL PROBLEMS IN ENGINEERING MECHANICS: Special topics, arranged and approved by the student's faculty advisor and the department chair. *1-6 sem. hrs.*

EGM 599. THESIS *3-6 sem. hrs.*

Department of ELECTRICAL ENGINEERING (ELE)

Donald L. Moon,
Chair of the Department

Electrical Engineering is a major concentration for both the Doctor of Philosophy in Engineering and the Doctor of Engineering. See Doctor's Degree Regulations in the introductory section of this chapter and consult with the department chair.

PROGRAM REQUIREMENTS

The program of study leading to the Master of Science in Electrical Engineering must include a minimum of 30 semester hours of credit consisting of the following:

1. Six semester hours in basic and engineering sciences. It is possible to combine six semester hours from separate areas. Selected courses must meet with the approval of the advisor.
2. Nine hours in electrical engineering core courses selected from:
 - ELE 501 Introduction to Digital Systems
 - ELE 506 Solid State Devices
 - ELE 507 Electromagnetic Fields
 - ELE 509 Analysis of Linear Systems
 - ELE 517 Random Processes in System Theory I.
3. Nine hours in a specialization area approved by the advisor.
4. Six hours on an approved thesis or six hours of additional engineering course work. Graduate Assistants are expected to use the thesis option.

A qualifying exam may be required for acceptance into the program. A final examination is required at the completion of the program..

See also Master's Degree Regulations in the introductory section of this

chapter. Specific course requirements are listed in the Electrical Engineering department graduate brochure.

COURSES OF INSTRUCTION

ELE 501. INTRODUCTION TO DIGITAL SYSTEMS: Combinational Logic Theory: Boolean Algebra, switching devices, MSI functions. Sequential Logic Theory: clock-mode circuits, pulse-mode circuits, incompletely specified circuits, level-mode circuits. Prerequisites: ELE 235 and ELE 313 or equivalents. 3 sem. hrs.

ELE 502. NETWORK SYNTHESIS: Synthesis of linear passive networks using classical pole-zero techniques; conditions for physical realizability approximating network functions and design to meet specific requirements; analysis and synthesis of linear active networks. Prerequisites: ELE 331, 413. 3 sem. hrs.

ELE 505. QUANTUM ELECTRONICS—PRINCIPLES: Principles of quantum theory; classical and quantum statistics; many-particle systems; electromagnetic interactions with materials. Applications to lasers and Q.M. communication theory. Prerequisite: ELE 440 or equivalent. 3 sem. hrs.

ELE 506. SOLID STATE DEVICES: Introduction to the theory of solid state electron devices. Bulk devices, junction devices, devices involving electric, magnetic, optical, and acoustical interactions. 3 sem. hrs.

ELE 507. ELECTROMAGNETIC FIELDS I: Fundamental concepts, wave equation and its solutions. Wave propagation, reflection and transmission. Potential theory, construction of solutions, various electromagnetic theorems: concept of source, uniqueness, equivalence, induction and reciprocity theorems. Prerequisite: ELE 333 or equivalent. 3 sem. hrs.

ELE 508. ELECTROMAGNETIC FIELDS II: Classification and construction of solutions. Plane cylindrical and spherical wave functions. Integral equations, mathematical theory of diffraction. Green's functions. Prerequisite: ELE 507. 3 sem. hrs.

ELE 509. ANALYSIS OF LINEAR SYSTEMS: A study of Fourier series, finite trigonometric series, Fourier transforms, and their application in the analysis of linear systems. 3 sem. hrs.

ELE 510. MICROWAVE ENGINEERING & SYSTEMS: Microwave transmission, planar transmission lines, microwave components and filters. Microwave semiconductor devices. Microwave tubes, microwave communication, radar systems, and electronic support measures. Prerequisite: ELE 507. 3 sem. hrs.

ELE 511. ANTENNAS AND RADIATION THEORY: Fundamental principles of antennas; analysis and synthesis of arrays; resonant antennas; frequency-independent antennas; aperture and reflector antennas; applications to radar and communication systems. Prerequisite: ELE 442. 3 sem. hrs.

ELE 512. ADVANCED ANTENNA THEORY: A study of advanced topics in antenna theory and design. Emphasis is on modern numerical methods such as the Method of Moments and the Geometrical Theory of Diffraction as applied to antenna problems. Antenna synthesis and current advanced topics are also covered. Computer programming is required. Prerequisite: ELE 507 and 511 or equivalent. 3 sem. hrs.

ELE 513. COMMUNICATION THEORY I: Review of the fundamentals of analog and digital communications; analog and digital signal detection in the presence of Gaussian noise; multilevel signals; thresholding for minimizing error probability; comparison of performance in a high-noise environment. Prerequisite: ELE 413 or equivalent, ELE 509, ELE 517. 3 sem. hrs.

ELE 514. ANALYSIS OF NONLINEAR SYSTEMS: An advanced study of methods of analysis on nonlinear systems with application in the fields of electric circuit theory and control systems. Prerequisite: ELE 509. 3 sem. hrs.

ELE 515. AUTOMATIC CONTROL THEORY: Analysis and synthesis of

feedback control systems; graphical frequency-response techniques; establishing performance criteria; state-space techniques. Prerequisite: ELE 432. 3 sem. hrs.

ELE 517. RANDOM PROCESSES IN SYSTEM THEORY I: An introduction to the theory of probability and random processes as applied to system theory. The axioms of probability; the concept of random variable, density, distributions; functions of random variables; correlation functions, spectral density functions, and their use in linear system theory. Prerequisites: ELE 331 or consent of instructor. 3 sem. hrs.

ELE 527. RANDOM PROCESSES IN SYSTEM THEORY II: A continuation of ELE 517, Random Processes in System Theory I, with emphasis on current topics such as Wiener and Kalman Filtering. Prerequisite: ELE 517. 3 sem. hrs.

ELE 533. COMPUTER DESIGN: Register Transfer Operations: Multi-input System controller design; Hardware Implementation of Arithmetic Processors and ALU; Instruction Format; Microprogramming; Hardwired and Microprogrammed Control; Program-controlled and Channel-oriented Input-Output Organization; Asynchronous Receiver-Transmitters, DMA, Handshaking and Interrupt. Comparative architectures. Prerequisite: ELE 501. 3 sem. hrs.

ELE 535. CODING THEORY: The theory of error-correcting, error-detecting codes as applied to the design of reliable digital data systems. Prerequisite: ELE 501. 3 sem. hrs.

ELE 536. MICROPROCESSOR APPLICATIONS: Project studies, applications of microprocessors in practical implementations. Logic implementation using software, memory mapped I/O problems and interrupt structure implementation. Use of assembler and/or cross assemblers. Study of alternate microprocessor families including industrial controllers using STD bus systems. Prerequisite: ELE 533. 3 sem. hrs.

ELE 541. POWER ELECTRONICS: Applications of power semiconductors to power control amplification, and regulation, in the light of an integrated, quantitative treatment of mechanical, thermal, and electrical characteristics and ratings; modeling for linear, nonlinear and switching modes; and thermal and electric circuit interactions. Prerequisite: ELE 313 or equivalent. *3 sem. hrs.*

ELE 543. COMMUNICATION THEORY II: Fundamentals of Spread Spectrum communication systems; direct sequence, pseudonoise, frequency hopping, time hopping modulation techniques; signal detection techniques; comparative analysis; applications. Prerequisite: ELE 513. *3 sem. hrs.*

ELE 551. ELECTRICAL POWER SYSTEMS DYNAMICS: Basic structure of the electrical power transmission system; criteria for system stability; symmetrical components; synchronous machine equations of motion, transients and dynamics; transmission line surges, short circuit calculations. Prerequisites: ELE 333, 431. *3 sem. hrs.*

ELE 555. SYSTEMS DYNAMICS I: The methodology for modeling the dynamics of complex social-economic systems. Use of these models to study organizational policies and design for higher-order, multiple-loop, nonlinear feedback structures. *3 sem. hrs.*

ELE 561. DIGITAL SIGNAL PROCESSING I: A study of one-dimensional digital signal processing, including a review of continuous-system analysis and sampling. Topics include z-transform techniques, digital filter, and Fast Fourier Transform processing techniques. *3 sem. hrs.*

ELE 562. DIGITAL SIGNAL PROCESSING II: A study of the architectural requirements for processors which perform one-dimensional digital signal processing. This will include the techniques for the design of both hardware and software elements needed for implementation of digital signal processors as well as discussions of application of these processors. Prerequisite: ELE 561. *3 sem. hrs.*

ELE 571. IMAGE PROCESSING: An introduction to image processing, including the human visual system, image formats, two-dimensional transforms, histograms, image restoration, and image reconstruction. Both digital and analog techniques are demonstrated. *3 sem. hrs.*

ELE 572. LINEAR SYSTEMS AND FOURIER OPTICS: Mathematical techniques pertaining to linear systems theory; Fresnel and Fraunhofer diffraction; Fourier transform properties of lenses; frequency analysis of optical systems, spatial filtering, application such as optical information processing and holography. Prerequisites: Acceptance into the graduate ELE program or permission of the chairman. *3 sem. hrs.*

ELE 573. ELECTRO-OPTICAL DEVICES AND SYSTEMS: Solid-state theory of optoelectronic devices; photoemitters; photodetectors; solar cells; detection and noise; displays; electro-optic, magneto-optic, and acousto-optic modulators; integration and application of electro-optical components in electro-optical systems of various types. Prerequisite: EOP 502 or permission of instructor. *3 sem. hrs.*

ELE 574. GUIDED WAVE OPTICS: Light Propagation in slab and cylindrical wave guides; signal degradation in optical fibers; optical sources, detectors, and receivers; coupling; transmission link analysis; fiber fabrication and cabling; fiber sensor system. Prerequisite: Acceptance into the ELE program or permission of chair. *3 sem. hrs.*

ELE 577L ELECTRO-OPTICAL LABORATORY: Experimentation with E-O systems emphasizing areas such as display technology, surveillance systems and components, and other disciplines in which electronic and optical elements are arranged to interact synergistically. *1 sem. hr.*

ELE 581. RADAR SYSTEMS ANALYSIS: The radar range equation is developed and its component parts examined in detail such as radar cross section, target scintillation, system noise figure, and signal-to-noise ratio.

Methods of radar measurement are presented for determining range, range rate (Doppler), and angular position. Specific system configurations examined include continuous wave, FM, moving target indication (MTI), pulse Doppler, and tracking radars. Prerequisite: ELE 501, ELE 517. *3 sem. hrs.*

ELE 595. SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING: Particular assignments to be arranged and approved by the chair of the department. *1-3 sem. hrs.*

ELE 599. THESIS *3-6 sem. hrs.*

ELE 601. FINITE AUTOMATA THEORY: Advanced Sequential Machine Theory: Finite-state machines, regular expressions, linear machines, sequential iterative systems, fault detection and diagnosis, applications. Prerequisite: ELE 501. *3 sem. hrs.*

ELE 612. METHODS IN RADAR CROSS SECTION: Solution of problems in radar cross section analysis and prediction. RCS of simple shapes and complex shapes. Reflection and transmission; impedance boundary condition, stratified media. Applications of the physical theory of diffraction and geometrical theory of diffraction to scattering problems. Prerequisite: ELE 507, ELE 511. *3 sem. hrs.*

ELE 613. DIGITAL COMMUNICATIONS: Fundamentals of digital communications systems including coding and channel capacity, detection and estimation, comparative performance of systems, synchronous vs. asynchronous methods, system synchronization, error control coding. Prerequisite: ELE 501, ELE 513. *3 sem. hrs.*

ELE 626. SYSTEM DYNAMICS II: The continuation of Systems Dynamics I with special emphasis on the study of large-scale corporate, urban, educational, and ecological systems. Prerequisite: ELE 555. *3 sem. hrs.*

ELE 636. ADVANCED COMPUTER ARCHITECTURES: Comparative evaluation of advanced and experimental computer structures. Investigation of optical, multiprocessor, array, various

hybrid and neural network type architectures. Prerequisite: ELE 536.
3 sem. hrs.

ELE 674. INTEGRATED OPTICS: Review of electromagnetic principles; dielectric slab waveguides; cylindrical dielectric waveguides; dispersion, shifting and flattening; mode coupling and loss mechanism; selected nonlinear waveguiding effects; integrated optical devices. Prerequisite: ELE 574. 3 sem. hrs.

ELE 690. SELECTED READINGS IN ELECTRICAL ENGINEERING: Directed readings in electrical engineering areas to be arranged and approved by the chair of the student's advisory committee and the department chair. May be taken more than once. 1-3 sem. hrs.

ELE 695. SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING: Special electrical engineering topics not covered in regular courses. Course sections arranged and approved by the chair of the student's advisory committee and the department chair. May be taken more than once. 1-3 sem. hrs.

ELE 698. D.E. DISSERTATION: An original investigation as applied to engineering practice. Results must be of sufficient importance to merit publication. 1-15 sem. hrs.

ELE 699. Ph.D. DISSERTATION: An original research effort in electrical engineering which makes a definite contribution to technical knowledge. Results must be of sufficient importance to merit publication. 1-15 sem. hrs.

ELECTRO-OPTICS (EOP)

Mohammad A. Karim,
Program Director

The programs of study for the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) in Electro-Optics are interdisciplinary programs administered by the School of Engineering with the cooperative support of the College of Arts and Sciences.

M.S. PROGRAM REQUIREMENTS

To be considered for admission to the M.S. program in electro-optics a student must have received an undergraduate degree with emphasis in engineering, physics, optics, chemistry, or applied mathematics. Students who have degrees in chemistry or applied mathematics, or in related sciences, are encouraged to apply, but they may be required to take a limited amount of undergraduate work to complete their preparation for graduate study in Electro-Optics. Students are expected to have competency in computer programming and modern electronics.

The program of study in electro-optics leading to a M.S. degree must include a minimum of 30 semester hours consisting of the following:

1. Twenty-one semester hours of core courses in Electro-Optics: EOP 501, EOP 502, EOP 505, EOP 506, EOP 513, EOP 514, EOP 541L, EOP 542L, EOP 543L.
2. Three semester hours of a technical elective.
3. Six semester hours of thesis work in the case of a thesis option or six semester hours of approved technical electives in the case of a non-thesis option.

While all students are expected to do a thesis, students supported by an assistantship are required to do a thesis.

Students who have received waiver of the thesis requirement will be examined by a three-person advisory committee just prior to their anticipated graduation date. This examination will be centered around an oral presentation on a topic mutually agreed to by the student and the advisory committee. At the discretion of the advisory committee, a written report may also be required. The examination may be repeated once, but not in the same academic term.

See also the Master's Degree Regulations in the introductory section of this chapter, and consult with the director of the Electro-Optics program.

Ph.D. PROGRAM REQUIREMENTS

To be considered for admission to the Ph.D. program in Electro-Optics, a student must have received a master's degree in Electro-Optics or its equivalent. Only the most promising students with a graduate GPA of 3.5/4.0 or above may be admitted.

The program of study in electro-optics leading to a Ph.D. degree must include a minimum of 90 semester hours beyond the bachelor's degree consisting of following.

1. Twenty-one semester hours of core courses in Electro-Optics: EOP 501, EOP 502, EOP 505, EOP 506, EOP 513, EOP 514, EOP 541L, EOP 542L, EOP 543L, or equivalent.
2. Twelve semester hours of approved graduate mathematics courses.
3. Twelve semester hours of approved 600-level Electro-Optics courses.
4. Thirty semester hours of doctoral dissertation in Electro-Optics.

See also the Doctor's Degree Regulations in the introductory section of this chapter, and consult with the director of the Electro-Optics program.

COURSES OF INSTRUCTION

EOP 501. GEOMETRIC OPTICS: Wavefronts and rays; Fermat's principle; Gaussian optics of axially symmetrical systems; aperture stops; pupils and field lenses; Lagrange invariant; angular and visual magnification; optical systems; plane mirrors and prisms; aberration theory; introduction to computer ray tracing. Prerequisites: Acceptance into the graduate Electro-Optics program or permission of the program director. *3 sem. hrs.*

EOP 502. OPTICAL RADIATION AND MATTER: Maxwell's equations; electromagnetic waves; interaction of radiation with atomic electrons; molecular and lattice vibration; study of phenomena related to the interaction of optical radiation with matter; polarization; crystal optics; nonlinear dielectric effects. Prerequisites: acceptance into the graduate Electro-Optics program or permission of the program director. *3 sem. hrs.*

EOP 505. INTRODUCTION TO LASERS: Laser theory; coherence; Gaussian beams; optical resonators; properties of atomic and molecular radiation; laser oscillation and amplification; methods of excitation of lasers; characteristics of common lasers; laser applications. Prerequisites: EOP 502 or a working knowledge of Maxwell's Equations, and physical optics, or permission of the course instructor or program director. *3 sem. hrs.*

EOP 506. ELECTRO-OPTICAL DEVICES AND SYSTEMS: Sources; modulators; switches, detectors; display technology; surveillance systems; electro-optical component applications in electro-optical systems; theory and design of electro-optical systems. Prerequisites: EOP 502, or permission of the program director. *3 sem. hrs.*

EOP 513. LINEAR SYSTEMS AND FOURIER OPTICS: Mathematical techniques pertaining to linear systems theory; Fresnel and Fraunhofer diffraction; Fourier transform properties of lenses; frequency analysis of

optical systems, spatial filtering, application such as optical information processing and holography. Prerequisites: Acceptance into the graduate EO program or permission of the program director. *3 sem. hrs.*

EOP 514. GUIDED WAVE OPTICS: Light Propagation in slab and cylindrical wave guides; signal degradation in optical fibers; optical sources, detectors, and receivers; coupling; transmission link analysis; fiber fabrication and cabling; fiber sensor system. Prerequisites: EOP 502 or permission of the program director. *3 sem. hrs.*

EOP 523. TOPICS IN MODERN OPTICS: Infrared systems, including radiometry, blackbody and graybody sources, detectors, materials, and optics. Thin-film optical coatings. Polarization of light using Mueller matrices and Stokes vectors. Optical measurements and instruments based on polarization. Fast Fourier Transform (FFT) and its applications to optics. Prerequisites: EOP 506 and EOP 513, or permission of the program director. *3 sem. hrs.*

EOP 524. OPTICAL COMPUTING SYSTEMS: Computation architectures; number systems; residue arithmetic; optical logic units; multi-purpose arithmetic modules communication busses; encoding, decoding and scaling; processor design methods. Prerequisites: EOP 513, and completion of a course in computer systems or permission of the program director. *3 sem. hrs.*

EOP 531. NEURAL NETWORKS: Nature and capabilities of Neural Networks; connectionism, self-organization, and adaptation; relations to fuzzy systems and genetic algorithms; back-propagation, adaptive resonance, associative memory, radial basis function, simulated annealing, and optically implementable neural networks. Prerequisites: MTH 302 or equivalent or permission of the program director. *3 sem. hrs.*

EOP 541L. ELECTRO-OPTICS LABORATORY I: Geometrical optics; characterization of optical elements; diffraction, interference; detectors; spectroscopy. Prerequisites: EOP 501 or a previous optics course, or permission of the course instructor or program director. *1 sem. hr.*

EOP 542L. ELECTRO-OPTICS LABORATORY II: Electro-Optical systems; display technology; electro-optical system components; optical detection; detectors; image processing. Prerequisites: EOP 506 or permission of the course instructor or program director. *1 sem. hr.*

EOP 543L. ELECTRO-OPTICS LABORATORY III: Laser characterization; properties of laser light; optical signal processing; holography; laser modulation; fiber optics. Prerequisites: EOP 541L or permission of the course instructor or program director. *1 sem. hr.*

EOP 595. SPECIAL PROBLEMS IN ELECTRO-OPTICS: Particular assignments to be arranged and approved by the director of the program. *2-6 sem. hrs.*

EOP 599. THESIS *3-6 sem. hrs.*

EOP 601. OPTICAL DESIGN: Chromatic aberrations: doublet lens; telephoto, wide-angle, and normal lenses; triplet lens design and variations; optimization methods and computer lens design; optical transfer functions; telescopes and microscopes; two-mirror telescope design: aspheric surfaces; prism and folded optical systems, rangefinders; gratings and holographic optical elements; anamorphic optical systems; zoom systems. Prerequisite: EOP 501. *3 sem. hrs.*

EOP 603. INTERFEROMETRY: Two-beam interference: wavefront division, amplitude division, localization of fringes, and interferometers; coherence; multiple-beam interference; Fabry-Perot interference and fringes of equal chromatic order; length measurements. Prerequisite: EOP 513. *3 sem. hrs.*

EOP 604. INTEGRATED OPTICS: Review of electromagnetic principles; dielectric slab waveguides; cylindrical dielectric waveguides; dispersion, shifting and flattening; mode coupling and loss mechanism; selected nonlinear waveguiding effects; integrated optical devices. Prerequisite: EOP 514.
3 sem. hrs.

EOP 621. STATISTICAL OPTICS: Optical phenomena and techniques requiring statistical methods for practical understanding and application; relevant statistical techniques for the analysis of image processing systems and the design of laser radar systems; engineering applications of statistical techniques. Prerequisites: completion of the core courses of the graduate Electro-Optics program or by permission of the program director.
3 sem. hrs.

EOP 622. TECHNIQUES OF OPTICAL PROCESSING: Techniques and applications of optical image and signal processing; coherent optics; matched filters; computer-generated holograms; spatial light modulators; incoherent optical processing; modulators for signal processing. Prerequisites: EOP 513 or permission of the program director.
3 sem. hrs.

EOP 625. LASER PROBE TECHNIQUES: Applications of optical phenomena and lasers to nonintrusive measurements; absorption and emission spectroscopies; laser-induced fluorescence spectroscopy; high-sensitivity detection methods using lasers; spontaneous and coherent Raman spectroscopies; Rayleigh and Mie scattering techniques; laser Doppler techniques; gas flow and combustion diagnostics and other applications of laser spectroscopy and light scattering. Prerequisites: EOP 505 or permission of the program director.
3 sem. hr

EOP 690. SELECTED READINGS IN ELECTRO-OPTICS: Directed readings in electro-optics areas to be arranged and approved by the chair of

the student's advisory committee and the program director. *1-3 sem. hrs.*

EOP 695. SPECIAL PROBLEMS IN ELECTRO-OPTICS: Special topics in electro-optics not covered in regular courses. Course sections arranged and approved by the chair of the student's advisory committee and program director.
1-3 sem. hrs.

EOP 699. PhD DISSERTATION: An original research in electro-optics which makes a definite contribution to technical knowledge. Results must be of sufficient importance to merit publication.
1-15 sem. hrs.

ENGINEERING (EGR)

Donald L. Moon,
Interim Program Director
and Interim Associate Dean of
Engineering

The Master of Science in Engineering allows flexibility for general or specialized program construction according to the needs of the individual student in conformance with the requirements of the School of Engineering and the University of Dayton. The program of study leading to the Master of Science in Engineering must include a minimum of 33 semester hours of the following.

1. Fifteen semester hours in a major area.
2. Fifteen semester hours of electives.
3. Three semester hours of research on an approved project.

See also Master's Degree Regulations in the introductory section of the Graduate Bulletin and consult with the director of the Master of Engineering Program.

ENGINEERING MANAGEMENT (ENM)

Patrick J. Sweeney, Chairperson

PROGRAM REQUIREMENTS

The program of study leading to the Master of Science in Engineering Management is designed to prepare the practicing engineer for the management of engineering activities in any environment—in industry, in government, in business, or the military. It must include a minimum of 36 semester hours consisting of the following:

1. Eighteen semester hours of core courses in Engineering Management. These are ENM 505, ENM 521, ENM 522, ENM 582, ENM 585, and ENM 590.
2. Nine semester hours of engineering electives. This requirement may be satisfied with nine semester hours of courses in the student's field of engineering expertise and/or experience.
3. Nine hours of electives as approved by the advisor and the program director.

See also Master's Degree Regulations in the introductory section of this chapter and consult with the advisor from the department.

COURSES OF INSTRUCTION

ENM 505. MANAGEMENT OF ENGINEERING SYSTEM I: This course is an introduction to the functions and tools of engineering management and the systems engineering process. Included as topics are the roles and relationships of engineering activities in the total enterprise, the models and techniques of systems analysis, engineering system design, and systems management. *3 sem. hrs.*

ENM 506. MANAGEMENT OF ENGINEERING SYSTEMS

II: Continuation of ENM 505 with emphasis on selective quantitative methods in systems engineering and engineering management. Case studies and application of methods are an integral part of the course. Prerequisite: ENM 505 or equivalent. *3 sem. hrs.*

ENM 510. TECHNOLOGICAL FORECASTING:

State-of-the-art techniques for technological forecasting in R & D and other related areas. Topics presented include the Delphi Method, techniques of technological forecasting, growth curves, and various relevant mathematical models. Areas of application are tailored to student interests. *3 sem. hrs.*

ENM 511. TECHNOLOGY ASSESSMENT:

Examination of the impacts of technological change on society. Review of the impacts of several major technological changes of the past, including both anticipated and unanticipated changes. Methods for assessing and predicting the consequences of technological change. *3 sem. hrs.*

ENM 515. HUMAN FACTORS ENGINEERING:

Introduction to the human factors criteria that should be considered in the design of man-machine systems, work situations, and man's physical environment. *3 sem. hrs.*

ENM 521. OPERATIONS RESEARCH I:

An introduction to the deterministic models and methods of operations research, with emphasis on the solution of real problems in both the public and private sectors. Problem formulation, mathematical model building, and algorithmic solution procedures are discussed specifically in the areas of linear, integer, and nonlinear programming, network analysis, and deterministic inventory analysis. Use is made of the personal computer in finding optimal solutions to problems. *3 sem. hrs.*

ENM 522. OPERATIONS RESEARCH II:

An introduction to the probabilistic models and methods of operations research. The course focuses on risk and uncertainty in the decision making process. Topics include Markov processes, queueing theory, reliability engineering, and forecasting. A major focus on the course is on simulation modeling. The personal computer is used to conduct simulations. Prerequisite: MSC 500 or equivalent. *3 sem. hrs.*

ENM 523. OPTIMIZATION I.

An introduction to the nonlinear optimization with applications in engineering and management science. Both single variable and multi-variable as well as unconstrained and constrained problems are addressed. The course is a blend of theory (e.g. Kuhn-Tucker conditions), numerical search techniques (e.g. conjugate directions methods), and applications. The personal computer is used for problem solving. *3 sem. hrs.*

ENM 530. COST AND ECONOMIC ANALYSIS FOR ENGINEERS:

Principles and methods of economic analysis of engineering activities. The time value of money, short-term and long-term investments, comparison of alternatives, replacement analysis, and minimum cost models. *3 sem. hrs.*

ENM 535. INTRODUCTION TO DECISION MAKING:

Introduction to rational decision making with applications in the analysis and design of engineering and management systems. Decision making under uncertainty and risk as well as under certainty. Group decision making. Multiple-criteria decision making. Prerequisite: MSC 501 or equivalent. *3 sem. hrs.*

ENM 541. PRODUCTION ENGINEERING:

The study of the integration of man, machine, and material in producing a marketable product. The use of engineering techniques to design, develop, and implement the production system are covered. Topics include break-even analysis, learning curve theory, forecasting, resource

balancing, inventory and production control, facility layout and location, job sequencing and scheduling and assembly line balancing. Modern production techniques such as just-in-time, MRP systems flexible manufacturing, and computer-integrated manufacturing are discussed. Prerequisite: ENM 521 or permission of the instructor. *3 sem. hrs.*

ENM 551. POLICY ANALYSIS AND PLANNING IN PUBLIC SYSTEMS I:

Introduction to the qualitative and quantitative methods of formulating and assessing policy making and planning in the public sector. Emphasis is placed on modeling economic and social impacts of public policy. *3 sem. hrs.*

ENM 552. POLICY ANALYSIS AND PLANNING IN PUBLIC SYSTEMS II:

Continuation of ENM 551 with emphasis on selected qualitative and quantitative methods of formulating and assessing policy making and planning. Case studies in application of the methods are an integral part of the course. Prerequisite: ENM 551 or equivalent. *3 sem. hrs.*

ENM 553. PUBLIC SYSTEMS ENGINEERING:

Guided study of the application of policy analysis and planning techniques for public systems. Emphasis on urban-regional improvement and world systems of energy and food. Prerequisite: ENM 551 or equivalent. *3 sem. hrs.*

ENM 555. SYSTEM DYNAMICS I:

Introduction to the methodology for modeling the dynamics of complex engineering, business, and socioeconomic systems. The use of these models to study the effect of organizational policies and design in higher-order, multiple-loop, nonlinear feedback systems. The Dynamo Simulation Language is used. *3 sem. hrs.*

ENM 556. SYSTEM DYNAMICS II:

Continuation of ENM 555 with emphasis on the study of large-scale corporate, urban, educational, and ecological systems. Prerequisite: ENM 555 or equivalent. *3 sem. hrs.*

ENM 560. QUALITY ASSURANCE: Application of statistical principles of analysis and control to production processes, studies of process capabilities, quality control, and engineering experimentation. Special topics covered include Total Quality Management, ISO 9000, and other current QC issues. Prerequisite: MSC 501 or equivalent. *3 sem. hrs.*

ENM 561. DESIGN AND ANALYSIS OF EXPERIMENTS: Advanced topics in experimental design and analysis, including experimental design, response surface analysis, multiple and partial regression and correlation. The use of the digital computer is emphasized. Prerequisite: MSC 501 or equivalent. *3 sem. hrs.*

ENM 565. RELIABILITY ENGINEERING I: An introduction to the concepts and methodology of reliability engineering. The reliability, maintainability, and availability of components and multi-component systems are analyzed. Topics include exponential, Weibull, lognormal and normal failure laws, static reliability, hazard rate functions, state dependent failure rate models, redundancy, censoring, empirical models, curve fitting to failure data, and reliability growth testing. Prerequisite: MSC 501 or equivalent. *3 sem. hrs.*

ENM 566. RELIABILITY ENGINEERING II: Continuation of ENM 565. Advanced topics in reliability engineering, with emphasis on the design of systems to meet specified reliability, availability, and maintainability requirements. Prerequisite: ENM 565 or equivalent. *3 sem. hrs.*

ENM 572. SYSTEM SIMULATION: An introduction to stochastic simulation. Topics covered include the generation of random numbers and random variables, the analysis of input data, the computer modeling of real systems the strategies, tactics, and experimentation in performing a simulation study, and the statistical analysis of simulation output. Prerequisites: MSC 501 or equivalent. *3 sem. hrs.*

ENM 575. INTRODUCTION TO ARTIFICIAL INTELLIGENCE: Introduction to the methods of AI with an emphasis on engineering design and analysis. Topics include knowledge representation, search, rule-based systems, pattern matching, automated reasoning, natural language processing, computer vision, and robotics. Most applications are illustrated with small Common Lisp programs. *3 sem. hrs.*

ENM 577. INTRODUCTION TO EXPERT SYSTEMS: Introduction to the development and application of rule-based systems using an integrated environment of commands, rules, databases, spreadsheets, text processing, and forms. Topics include knowledge representation, inference, search, ID3 algorithm, and logic along with suitable applications and subsequent implementations. *3 sem. hrs.*

ENM 579. SELECTED TOPICS IN ARTIFICIAL INTELLIGENCE: Special topics include engineering applications using neural net architecture, object-oriented programming, genetic algorithm and advanced search methods illustrated in Common Lisp and a rule-based environment. Prerequisites: ENM/MS 575 and ENM/MS 577 or permission of the instructor. *1-3 sem. hrs.*

ENM 582. ORGANIZATIONAL DEVELOPMENT IN AN ENGINEERING ENVIRONMENT: The interpersonal and group skills needed by the engineering manager. Emphasis on establishing work environments which allow for communication, trust, high morale, satisfaction, and productive group activity. Special topics covered include TQM implementation, high performing teams, and other current issues. *3 sem. hrs.*

ENM 585. ORGANIZATIONAL SYSTEMS: Introduction to organizational theory and practice with emphasis on the design of organizational structures for the effective integration of production, research and development, and engineering activities. Special topics include high performing systems, the technical ad-hoc commit-

tee, matrix organization, and project management and other current issues. *3 sem. hrs.*

ENM 586. DESIGN OF ORGANIZATIONAL SYSTEMS: Guided study of the design and simulations of organizations. The emphasis is on the simulation and implementation of actual design to an organization. Prerequisite: ENM 585. *3 sem. hrs.*

ENM 590. CASE STUDIES IN ENGINEERING MANAGEMENT: Student participation in an engineering management project or study under the direction of a project advisor. A satisfactory written engineering report, as determined by the project advisor, is required at the completion of the project. Prerequisite: permission of the advisor. *3 sem. hrs.*

ENM 595. SPECIAL PROBLEMS IN ENGINEERING MANAGEMENT: Special assignments in engineering management to be arranged and approved by the advisor and the program director. *1-3 sem. hrs.*

MANAGEMENT SCIENCE (MSC)

Patrick J. Sweeney, Program Director

PROGRAM REQUIREMENTS

The program leading to the Master of Science in Management Science is interdisciplinary and is administered by the School of Engineering with the cooperative support of the College of Arts and Sciences, the School of Business Administration, and the School of Education. Applications are invited from college graduates in all fields of study—business, education, engineering, the liberal arts, the physical sciences, and the social sciences. The applicant whose preparation does not include at least three

semesters of analytic geometry and calculus, two semesters of probability and statistics, and competence in a computer language will be expected to satisfactorily complete appropriate prerequisite courses prior to admission to the program.

The management scientist is the manager or staff specialist who is trained in the quantitative methodologies of operations research, systems analysis, and the decision sciences. The student is proficient in problem solving and decision making, system modeling and optimization, and the application of probability and statistical theory to management problems and must be familiar with a variety of other topics, such as quality control, inventory planning and control, reliability and maintainability, and system simulation.

The objective of this program is to develop quantitative management skills and capabilities appropriate to each student's needs and objectives. The program emphasizes the practical application of the techniques of management science in our modern society, and the importance of the computer as a tool for the management scientist is stressed throughout the program. The program of study must include a minimum of 36 semester hours consisting of the following:

1. Eighteen semester hours of courses in Management Science. These should provide depth in both deterministic and stochastic methods and will normally include MSC 521, 522, 535, and three courses selected in consultation with the advisor.
2. Nine semester hours in a cognate field appropriate to the student's objectives, as approved by the advisor. Approved fields of study for the cognate field are applied mathematics, artificial intelligence, business administration, computer science, educational administration, engineering, human factors, manufacturing, and public administration.
3. Nine semester hours of electives as approved by the advisor and the program director.

See also Master's Degree Regulations in the introductory section of this chapter and consult with the advisor.

COURSES OF INSTRUCTION

MSC 500. PROBABILISTIC METHODS I. Advanced methods of engineering analysis for engineering managers and management scientists. Methods of operational calculus, probability modeling, and statistical analysis as applied to problems of analysis and design in engineering systems and management science.

3 sem. hrs.

MSC 501. PROBABILISTIC METHODS II: Advanced methods of engineering analysis for engineering managers and management scientists. Methods of linear algebra and inferential and experimental statistics as applied to problems of analysis and design in engineering systems and management science. Prerequisite: MSC 500 or equivalent.

3 sem. hrs.

MSC 521. OPERATIONS RESEARCH I: An introduction to the deterministic models and methods of operations research, with emphasis on the solution of real problems in both the public and private sectors. Problem formulation, mathematical model building and algorithmic solution procedures are discussed specifically in the areas of linear, integer, and nonlinear programming, network analysis, and deterministic inventory analysis. Use is made of the personal computer in finding optimal solutions to problems.

3 sem. hrs.

MSC 522. OPERATIONS RESEARCH II: An introduction to the probabilistic models and methods of operations research. The course focuses on risk and uncertainty in the decision-making process. Topics include Markov processes, queueing theory, reliability engineering, and forecasting. A major focus of the course is on simulation modeling. The personal computer is used to conduct simulations. Prerequisite: MSC 500 or equivalent.

3 sem. hrs.

MSC 523. OPTIMIZATION I: An introduction to nonlinear optimization with applications in engineering and management science. Both single variable and multivariable as well as unconstrained and constrained problems are addressed. The course is a blend of theory (e.g. Kuhn-Tucker conditions), numerical search techniques (e.g. conjugate directions methods), and applications. The personal computer is used for problem solving.

3 sem. hrs.

MSC 526. OPTIMIZATION II: Advanced topics in linear programming with application to real-world problems. Topics include the revised simplex method, dual-simplex, interior point algorithms, duality and sensitivity analysis, decomposition principle, trans-shipment problem network simplex, and goal and integer programming. Prerequisite MSC 521.

3 sem. hrs.

MSC 527. OPTIMIZATION III: Advanced topics in nonlinear and dynamic programming and introduction to the calculus of variations, with application to real-world problems. Topics include convex and non-convex programming, geometric, fractional, and quadratic programming, separable programming, discrete and continuous dynamic programming with both finite and infinite planning horizons, and equivalence of solutions in dynamic and non-linear programming and calculus of variations. Prerequisites MSC 523 and MSC 526.

3 sem. hrs.

MSC 535. APPLIED OPERATIONS RESEARCH/MANAGEMENT SCIENCE: This is a capstone course for the management science program integrating the concepts and techniques covered in earlier courses. The focus is on the methodology of conducting an OR/MS study. Case studies and applications are presented. An OR/MS project is an integral part of the course. Prerequisite: MSC 501, 521, & 522 or equivalent.

3 sem. hrs.

MSC 541. PRODUCTION ENGINEERING: The study of the integration of man, machine, and

material in producing a marketable product. Engineering techniques used to design, develop, and implement the production system are covered. Topics include break-even analysis, learning curve theory, forecasting, resource balancing, inventory and production control, facility layout and location, job sequencing and scheduling, and assembly line balancing. Modern production techniques such as just-in-time, MRP systems flexible manufacturing, and computer integrated manufacturing are discussed. Prerequisites: MSC 501 or equivalent; ENM 521 or permission of the instructor.

3 sem. hrs.

MSC 542. INVENTORY THEORY AND APPLICATION: An in depth coverage of inventory theory including both deterministic and stochastic models. Topics include EOQ models, quantity discounting, constrained inventory, the fixed reorder point model, the fixed review model, repairable inventory systems, and dynamic inventory/production models. Also discussed are system backorder and availability models. Applications include both the public and private sectors. Prerequisites: MSC 501, MSC 521, MSC 522 or equivalent.

3 sem. hrs.

MSC 544. DISCRETE TIME SERIES: Emphasis on industrial application of open loop statistical forecasts. Techniques of describing a time series by very general classes of functions, including trigonometric functions. Prerequisites: MSC 501, MSC 522 or equivalent.

3 sem. hrs.

MSC 546. QUEUEING THEORY AND APPLICATION: Emphasis on application of queueing theory to engineering problems. Machine interference, mathematical queueing models, marketing models, servicing problems, Monte Carlo techniques, and computer simulation models. Prerequisites: MSC 501, MSC 522 or equivalent.

3 sem. hrs.

MSC 555. SYSTEM DYNAMICS I: Introduction to the methodology for modeling the dynamics of complex engineering, business, socioeconomic systems. The use of these models to

study the effect of organizational policies and design in higher order, multiple-loop, nonlinear feedback systems. The Dynamo Simulation Language is used.

3 sem. hrs.

MSC 556. SYSTEM DYNAMICS II: Continuation of MSC 555 with emphasis on the study of large-scale corporate, urban, educational, and ecological systems. Prerequisite: MSC 555 or equivalent.

3 sem. hrs.

MSC 560. QUALITY ASSURANCE: Application of statistical principles of analysis and control to production processes, studies of process capabilities, quality control, and engineering experimentation. Special topics covered include Total Quality Management, ISO 9000, and other current QC issues. Prerequisite: MSC 501 or equivalent.

3 sem. hrs.

MSC 561. DESIGN AND ANALYSIS OF EXPERIMENTS: Advanced topics in experimental design and analysis, including experimental design, response surface analysis, multiple and partial regression and correlation. The use of the digital computer is emphasized. Prerequisite: MSC 501 or equivalent.

3 sem. hrs.

MSC 565. RELIABILITY ENGINEERING I: An introduction to the concepts and methodology of reliability engineering. The reliability, maintainability, and availability of components and multi-component systems are analyzed. Topics include exponential, Weibull, lognormal and normal failure laws, static reliability, hazard rate functions, state dependent failure rate models, redundancy, censoring, empirical models, curve fitting to failure data, and reliability growth testing. Prerequisites: MSC 501 or equivalent.

3 sem. hrs.

MSC 566. RELIABILITY ENGINEERING II: Continuation of MSC 565. Advanced topics in reliability engineering, with emphasis on the design of systems to meet specified reliability, availability, and maintainability requirements. Prerequisite: MSC 565 or equivalent.

3 sem. hrs.

MSC 572. SYSTEM SIMULATION. An introduction to stochastic stimulation. Topics covered include the generation of random numbers and random variables, the analysis of input data, the computer modeling of real systems, the strategies, tactics, and experimentation in performing a simulation study, and the statistical analysis of simulation output. Prerequisites: MSC 501 and MSC 522 or equivalent.

3 sem. hrs.

MSC 575. INTRODUCTION TO ARTIFICIAL INTELLIGENCE: Introduction to the methods of artificial intelligence, with emphasis on application to engineering design and analysis. Topics include knowledge representation, search, expert systems, pattern matching, automated reasoning, natural language processing, computer vision, and robotics. Most applications are illustrated with small Common Lisp programs.

3 sem. hrs.

MSC 577. INTRODUCTION TO EXPERT SYSTEMS: Introduction to the development and application of rule-based systems using an integrated environment of commands, rules, databases, spreadsheets, text processing, and forms. Topics include knowledge representation, inference, search, ID3 algorithm, and logic along with suitable applications and subsequent implementation.

3 sem. hrs.

MSC 579. SELECTED TOPICS IN ARTIFICIAL INTELLIGENCE: Special topics include engineering applications using neural net architecture, object-oriented programming, genetic algorithm and advanced search methods illustrated in Common Lisp and a rule-based environment. Prerequisites: ENM/MS 575 and ENM/MS 577 or permission of the instructor.

1-3 sem. hrs.

MSC 595. CURRENT PROBLEMS: (Subject will vary.) Topics of current interest in specialized areas of Management Science.

3 sem. hrs.

MSC 599. THESIS

6 sem. hrs.

MATERIALS ENGINEERING (MAT)

James A. Snide,
Director of the Program

Materials Engineering is a major concentration for both the Doctor of Philosophy in Engineering and the Doctor of Engineering. See Doctor's Degree Regulations in the introductory section of this chapter and consult with the director of the programs.

PROGRAM REQUIREMENTS

The program of study leading to the Master of Science in Materials Engineering must include a minimum of 30 semester hours consisting of the following:

1. Twelve semester hours in the major field.
2. Twelve semester hours of approved electives from current course offerings which best suit the student's requirements.
3. Six semester hours of research on a Materials Engineering project or thesis. Upon the request of the student and with the approval of the advisor and the program director, this may be replaced by nine semester hours of additional course work.

See also Master's Degree Regulations in the introductory section of this chapter, and consult with the advisor.

COURSES OF INSTRUCTION

MAT 501. PRINCIPLES OF MATERIALS I: Structure of engineering materials from electronic to atomic and crystallographic considerations. Includes atomic structure and interatomic bonding, imperfections, diffusion, mechanical properties, strengthening mechanisms, failure, phase diagrams, phase transformations and processing. Prerequisites: College chemistry, physics and MTH 219.

3 sem. hrs.

MAT 502. PRINCIPLES OF MATERIALS II: Structure and behavior of ceramics, polymers and composites to include mechanical behavior, corrosion, electrical, thermal, magnetic and optical properties. Prerequisite: MAT 501 or equivalent.

3 sem. hrs.

MAT 503. X-RAY CRYSTALLOGRAPHY: A broad coverage of fundamental crystallography, the interaction of x-rays with matter, and the x-ray scattering techniques used to study materials. Prerequisite: MAT 501 or consent of instructor.

3 sem. hrs.

MAT 504. TECHNIQUES IN MATERIALS ANALYSIS: Fundamentals and applications of the traditional analytical methods such as x-ray analysis, electron microprobe, and transmission and scanning microscopy. Techniques such as NMR, Atomic Absorption, Raman, and Mossbauer spectroscopy will be covered. Emphasis on applicability. Prerequisite: MAT 501 or consent of instructor.

3 sem. hrs.

MAT 505. THERMODYNAMICS OF SOLIDS: Laws of thermodynamics, auxiliary functions, thermodynamic relations, phase transitions, thermodynamic equilibrium, thermodynamic properties of solid solutions, surfaces and interfaces. Prerequisite: MAT 501 or consent of instructor.

3 sem. hrs.

MAT 506. MECHANICAL BEHAVIOR OF MATERIALS: Description of the state of stress and strain in materials, plastic deformation, fatigue, fracture, creep, and rupture. Prerequisite: Undergraduate course in Strength of Materials (EGM 303) or consent of instructor.

3 sem. hrs.

MAT 507. INTRODUCTION TO CERAMIC MATERIALS: A brief history, the raw materials, processing methods and chemistry fundamentals associated with the technology of structural ceramics are discussed. The properties (physical, thermal, mechanical, electrical, magnetic and optical) and the methods for measuring these properties for ceramic materials are reviewed. Both conventional and advanced applications for ceramics are presented. Prerequisite: MAT 501.

3 sem. hrs.

MAT 508. PRINCIPLES OF MATERIAL SELECTION: Basic scientific and practical consideration involved in the intelligent selection of materials for specific applications. Impact of new developments in materials technology and analytical techniques. Prerequisite: MAT 501 or consent of instructor.

3 sem. hrs.

MAT 509. INTRODUCTION TO POLYMER SCIENCE: To provide a technical overview of the nature of synthetic macromolecules including the formation of polymers and their structure, structure-property relationships, polymer characterization and processing, and applications of polymers. Prerequisites: College chemistry, calculus, and organic chemistry.

3 sem. hrs.

MAT 510. PHYSICAL PROPERTIES OF POLYMERS: Intensive discussion of the interrelations between molecular structure and gross physical properties of polymers. Emphasis on relating laboratory data to industrial applications. Prerequisites: Background in differential equations, organic or physical chemistry, or MAT 509.

3 sem. hrs.

MAT 511. PRINCIPLES OF CORROSION: Application of electrochemical principles, corrosion reactions, passivation, cathodic and anodic protection, stress corrosion, and high temperature oxidation. Prerequisite: MAT 501.

3 sem. hrs.

MAT 512. MAGNETIC MATERIALS—PHYSICAL PRINCIPLES: Description of magnetic material properties. The magnetic circuit. Atomic magnetism. Types of magnetic order and spin structure. Intrinsic magnetization. Molecular field concept. Anisotropy. Magnetostriction. Magnetic resonances. Prerequisite: ELE 333 or consent of instructor.

3 sem. hrs.

MAT 513. MAGNETIC MATERIALS FOR ENGINEERING APPLICATIONS: Magnetic domains. Technical magnetization and domain structure. A.C. properties, losses, eddy currents. Causes of coercivity. Metallic and ceramic materials for transformers,

electrical machinery, permanent magnets, HF devices, data recording, computer memories. Metallurgy and crystallography of magnetic materials. Prerequisite: MAT 512 or consent of instructor. Note: Simultaneous attendance in MAT 513S is recommended.

3 sem. hrs.

MAT 513S. MAGNETIC MATERIALS PROSEMINAR 1 sem. hr.

MAT 514. APPLIED SUPERCONDUCTIVITY - AN INTRODUCTION:

Basic phenomena. Theoretical concepts, superconductive materials - types, properties, physics, metallurgy, superconducting magnets. Other present and future engineering applications. Prerequisite: consent of instructor.

3 sem. hrs.

MAT 515. STATISTICAL THERMODYNAMICS: Microscopic thermodynamics; Boltzmann, Bose-Einstein, Fermi-Dirac statistics; statistical interpretation of thermodynamic quantities. Applications to perfect and real gases, liquids, crystal-line solids, and thermal radiation. Prerequisites: MEE 301, MTH 219.

3 sem. hrs.

MAT 516. SOLIDIFICATION OF METALS: Solidification, diffusion, phase diagrams, phase transformations—diffusional and diffusionless, microstructure. Prerequisite: MAT 501 or consent of instructor.

3 sem. hrs.

MAT 517. PHASE DIAGRAMS: Introduction to phase equilibria; construction, interpretation and application of phase diagrams for unary, binary, ternary, and higher order systems. Prerequisite: MAT 501.

3 sem. hrs.

MAT 518. DIFFUSION IN SOLIDS: Considers the rate of response on condensed matter to changes in environmental conditions such as temperature. Specific topics include basic rate theory, heavy emphasis on diffusion, and phase transformation. Prerequisites: MAT 501, MAT 505.

3 sem. hrs.

MAT 519. PHASE TRANSFORMATION: Classical treatment of phase

transformation, nucleation and growth, recovery and recrystallization and advanced processes in control microstructures and properties. New developments in the area of phase transformations. Prerequisite: MAT 501.

3 sem. hrs.

MAT 520. POWDER METALLURGY: Detailed treatment of scientific principles behind rapid solidification processing, powder production methods: metal and ceramic powders, powder analysis and powder consolidation, principles of mechanical alloying, processing methods and steps involved in producing P/M product forms, implications of powder metallurgy microstructures on mechanical behavior. Prerequisite: MAT 501.

3 sem. hrs.

MAT 521. NONDESTRUCTIVE EVALUATION: Both theoretical and experimental treatment of flaw detection and material characterization techniques for metals as well as advanced composites using ultrasound and eddy current methods of NDE. Also, statistical analysis of reliability, probability of detection and quality assurance provided. Prerequisite: Consent of instructor.

3 sem. hrs.

MAT 525. DESIGN OF MACROMOLECULAR SYSTEMS: Polymer preparation by chain polymerization and stepwise polymerization; copolymerization; stereospecific polymerizations; formation of network polymers; heterogeneous reaction systems; aging and stabilization. Prerequisites: CHM 314, MAT 510.

3 sem. hrs.

MAT 526. POLYMER ENGINEERING: Rheology of polymer materials; fundamentals of polymer processing; design of processing operation and their relation to the physical and mechanical behavior of polymers in molten and solid states; control of polymer processing through proper material selection. Prerequisites: MEE 308, MEE 410, MAT 510.

3 sem. hrs.

MAT 527. METHODS OF POLYMER ANALYSIS: Modern laboratory techniques used in preparation and characterization of polymers; experimental investigations of polymer

structure-property relations; measurement of molecular weight averages and distributions, thermal and mechanical properties, viscoelastic properties; transitions and crystallinity. Prerequisites: MAT 509, MAT 510.

3 sem. hrs.

MAT 530. INTRODUCTION TO ANALYTICAL ELECTRON MICROSCOPY: This course is an introduction to the use of analytical transmission electron microscopy applied to the study of materials. Techniques and principles of the following will be covered: design and operation of the AEM, image formation, crystallography and the reciprocal space construction, selected area diffraction, convergent beam electron diffraction, energy dispersive X-ray microanalysis, and electron energy loss spectroscopy. Prerequisite: College physics.

3 sem. hrs.

MAT 535. HIGH TEMPERATURE MATERIALS: This course will provide the student with the basic material behavior concepts which control high-temperature properties of metals and alloys. A special emphasis will be given to creep behavior of metals which will include a comprehensive study of relationships between microstructure and high-temperature creep deformation of pure metals, single-phase alloys, multi-phase alloys and dispersion-strengthened materials. In addition, the properties and applications of high-temperature materials will be discussed, especially of these alloys used in the aerospace industry, such as titanium and nickel-based alloys. Prerequisite: MAT 501 or equivalent.

3 sem. hrs.

MAT 541. EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS: Introduction to the mechanical response of fiber-reinforced composite materials with emphasis on the development of experimental methodology. Analytical topics include stress-strain behavior of anisotropic materials, laminate mechanics, and strength analysis. Theoretical models are applied to the analysis of experimental techniques used for characterizing composite materials. Lectures are supplemented by laboratory sessions in which characterization tests are

performed on contemporary composites. Prerequisite: EGM 303.

3 sem. hrs.

MAT 542. ADVANCED COMPOSITES: Materials and Processing. Comprehensive introduction to advanced fiber reinforced polymeric matrix composites. Constituent materials and composite processing will be emphasized with special emphasis placed on structure-property relationships, the role of matrix in composite processing, mechanical behavior and laminate processing. Specific topics will include starting materials, material forms, processing, quality assurance, test methods, and mechanical behavior. Prerequisites: MAT 501, MAT 509, or consent of the instructor.

3 sem. hrs.

MAT 543. ANALYTICAL MECHANICS OF COMPOSITE MATERIALS: Analytical models are developed for predicting the mechanical and thermal behavior of fiber reinforced composite materials as a function of constituent material properties. Both continuous and discontinuous fiber reinforced systems are considered. Specific topics include basic mechanics of anisotropic materials, micromechanics, lamination theory, free-edge effects, and failure criteria. Prerequisite: EGM 303

3 sem. hrs.

MAT 544. MECHANICS OF COMPOSITE STRUCTURES: Comprehensive treatment of laminated beams, plates, and sandwich structures. Effect of heterogeneity and anisotropy on bending under lateral loads, buckling, and free vibration are emphasized. Shear deformation and other higher-order theories and their range of parametric application are also considered. Prerequisite: MAT 543 or consent of instructor.

3 sem. hrs.

MAT 550. MATERIALS ENGINEERING PROJECT: Student participation in a materials engineering project under the direction of a project advisor. The student prepares a satisfactory written report, as determined by the project advisor, and presents an open seminar on the subject of the project.

1-6 sem. hrs.

MAT 560. INTRODUCTION TO IMPACT DYNAMICS: Introduction to impact phenomena, characteristics of elastic stress waves in bars, elastic-plastic stress waves in bars and plates, introduction to shock waves, material characterization at high strain rates, experimental techniques, impact on ductile, brittle, and composite materials, computer codes for impact simulation.

3 sem. hrs.

MAT 562. SHOCK WAVES AND PENETRATION MECHANICS: Shock waves in ductile, brittle and composite materials, penetration mechanics of projectiles in metals, composites, and brittle materials, analytical and computational modeling. Prerequisite: MAT 560.

3 sem. hrs.

MAT 570. FRACTURE MECHANICS: Application of principles of fracture mechanics to fatigue and fracture in engineering structures. Prerequisites: MAT 506 or consent of instructor.

3 sem. hrs.

MAT 575. FRACTURE AND FATIGUE OF METALS AND ALLOYS: Treatment of the effects of microstructure on the fracture and fatigue of engineering metals and alloys with a special emphasis on static and dynamic brittle and ductile failures and crack initiation. Alloy fracture resistance, fracture toughness, and method to improve fracture behavior will be discussed in detail. Various analytical techniques in the failure analysis of structural components will be presented. Prerequisite: MAT 501, MAT 506 or consent of instructor.

3 sem. hrs.

MAT 576. FRACTURE AND FATIGUE OF METALS AND ALLOYS II: This course will cover the areas of the effects of microstructure on fatigue crack propagation and of environment on fracture and fatigue. This will include fatigue life prediction, damage tolerance approach to component design and microstructural and structural synthesis for optimum behavior. Specific material related aspects of fatigue mechanisms, fracture mechanics approach, and failure analysis will also be covered. Prerequisite: MAT 575 or equivalent.

3 sem. hrs.

MAT 590. SELECTED READINGS IN MATERIALS ENGINEERING: Directed readings in selected areas of materials engineering arranged and approved by the student's advisor and the program director.

1-3 sem. hrs.

MAT 595. SPECIAL PROBLEMS IN MATERIALS ENGINEERING: Special assignments arranged by the materials engineering faculty.

1-3 sem. hrs.

MAT 599. THESIS

3-6 sem. hrs.

MAT 601. SURFACE CHEMISTRY OF SOLIDS: The nature of solid surfaces as determined by the techniques of x-ray photoelectron and Auger electron spectroscopy, secondary ion mass spectrometry, and ion scattering spectroscopy. Prerequisites: MAT 501 or consent of instructor.

3 sem. hrs.

MAT 690. SELECTED READINGS IN MATERIALS ENGINEERING: Directed readings in materials engineering area arranged and approved by the chair of the student's advisory committee and the program director. May be repeated.

1-3 sem. hrs.

MAT 695. SPECIAL PROBLEMS IN MATERIALS ENGINEERING: Special assignments in materials engineering subject matter arranged and approved by the student's doctoral advisory committee and the program director. May be repeated.

1-3 sem. hrs.

MAT 698. D.E. DISSERTATION: An original investigation as applied to materials engineering practice. Results must be of sufficient importance to merit publication.

1-15 sem. hrs.

MAT 699. Ph.D. DISSERTATION: An original research effort which makes a definite contribution to technical knowledge. Results must be of sufficient importance to merit publication.

1-15 sem. hrs.

Department of
**MECHANICAL
 ENGINEERING**
(MEE)

Glen Johnson,
 Chair of the Department

Mechanical Engineering is a major concentration for both the Doctor of Philosophy in Engineering and the Doctor of Engineering. See Doctor's Degree Regulations in the introductory section of this chapter and consult with the department chair and the director of the programs.

PROGRAM REQUIREMENTS

For the Master of Science in Mechanical Engineering, major areas of concentration are Materials, Thermal Sciences, Fluid Mechanics, Solid Mechanics, Mechanical Design, and Integrated Manufacturing. Each program of study leading to this degree must include a minimum of 30 semester hours approved by the student's advisor, and consisting of the following:

1. Twelve semester hours in mechanical engineering courses to be selected from one of the following areas of concentration.

Materials—MEE 501, 502, 503, 505, 506, 508, 509, 525, 541, 542, 543, 544, 570, 575, 576.

Thermal Sciences—MEE 503, 504, 505, 511, 512, 513, 514, 515, 516, 517, 552, 565, 566, 567, 568, 569.

Fluid Mechanics—MEE 503, 504, 513, 516, 540, 552, 553, 555.
 AEE 501, 502, 554, 556, 558.

Solid Mechanics—MEE 503, 519, 533, 534, 535, 536, 538, 539, 543, 544, 545, 546, 547, 548, 549, 570, 575.

Mechanical Design—MEE 503, 506, 527, 532, 533, 534, 535, 536, 538, 539, 540, 545, 546, 547, 548, 549, 570, 575, 582, 585.

Integrated Manufacturing—MEE 527, 545, 580, 581, 582, 583, 584, 585.

2. Six semester hours of research on a mechanical engineering project or thesis. Both a written document and an oral presentation are required. Upon the request of the student and with the approval of the faculty advisor and the department chair, this requirement may be replaced by six semester hours of additional course work. A maximum of six semester hours may be taken in 550, 590, 595, and 599 courses.
3. Three semester hours of mathematics approved by the student's advisor.
4. Up to nine semester hours of electives, to be chosen from current course offerings which best suit the student's requirements and approved by the student's advisor.

See also Master's Degree Regulations in the introductory section of this chapter and consult with the advisor.

COURSES OF INSTRUCTION

Students who have completed work equivalent to the prerequisite courses may be enrolled in these courses with the consent of the instructor.

MEE 500. ADVANCED ENGINEERING ANALYSIS: Detailed analysis of engineering problems using laws of nature, fundamental engineering principles, mathematics, computers and practical experience to construct, resolve and test analytic models of physical events. Emphasis is on the use of the professional engineering approach which includes formulation of the problem, assumptions, plan or method of attack, solving the problem, checking and generalizing the results.
3 sem. hrs.

MEE 501. PRINCIPLES OF MATERIALS I: Structure of engineering materials from electronic to atomic and crystallographic considerations. Includes atomic structure and interatomic bonding, imperfections, diffusion, mechanical properties, strengthening mechanisms, failure, phase diagrams, phase transformations and processing. Prerequisites: College chemistry, physics and MTH 219.
3 sem. hrs.

MEE 502. PRINCIPLES OF MATERIALS II: Structure and behavior of ceramics, polymers and composites to include mechanical behavior, corrosion, electrical, thermal, magnetic and optical properties. Prerequisite: MAT 501 or equivalent.
3 sem. hrs.

MEE 503. INTRODUCTION TO CONTINUUM MECHANICS: Tensors, calculus of variations, Lagrangian and Eulerian descriptions of motion. General equations of continuum mechanics, constitutive equations of mechanics, thermodynamics of continua. Specialization to cases of solid and fluid mechanics. Prerequisite: EGM 303.
3 sem. hrs.

MEE 504. FUNDAMENTALS OF FLUID MECHANICS: An advanced course in fluid mechanics with emphasis on the derivation of conservation equations and the application of constitutive theory. Development and scope of the Navier-Stokes equations. Nature and role of vorticity transport. Exact and approximate solutions to classical viscous and inviscid problems. Compressible and incompressible flows. Co-requisite: MEE 503.
3 sem. hrs.

MEE 505. THERMODYNAMICS OF SOLIDS: Laws of thermodynamics, auxiliary functions, thermodynamic relations, phase transitions, thermodynamic equilibrium, thermodynamic properties of solid solutions, surfaces and interfaces. Prerequisite: MAT 501 or consent of instructor.
3 sem. hrs.

MEE 506. MECHANICAL BEHAVIOR OF MATERIALS: Description of the state of stress and strain in materials, plastic deformation, fatigue, fracture, creep, and rupture. Prerequisite:

site: EGM 303 or consent of instructor.
3 sem. hrs.

MEE 508. PRINCIPLES OF MATERIALS SELECTION: Basic scientific and practical consideration involved in the intelligent selection of materials for specific applications. Impact of new developments in materials technology and analytical techniques. Prerequisite: MEE 501 or consent of instructor.
3 sem. hrs.

MEE 509. INTRODUCTION TO POLYMER SCIENCE: To provide a technical overview of the nature of synthetic macromolecules including the formation of polymers and their structure-property relationships, polymer characterization and processing, and applications of polymers. Prerequisites: College chemistry, calculus, and organic chemistry.
3 sem. hrs.

MEE 511. CLASSICAL THERMODYNAMICS: Equilibrium, first law, second law, state principle, and zeroth law; development of entropy and temperature from availability concepts; chemical potential, chemical equilibrium, and phase equilibrium. Thermodynamics of irreversible processes; Onsager reciprocal relations; application of these concepts to direct energy conversion.
3 sem. hrs.

MEE 512. MICROSCOPIC THERMODYNAMICS: Microscopic thermodynamics; kinetic theory; virial theorem of Clausius; transport phenomena; Gibbs, Boltzman, Bose-Einstein, Fermi-Dirac statistics. Connection between statistical and thermodynamic quantities. Applications to perfect and real gases, liquids, crystalline solids, and thermal radiation. Irreversible thermodynamics.
3 sem. hrs.

MEE 513. PROPULSION: Principles of propulsive devices, aerothermodynamics, diffuser and nozzle flow, energy transfer in turbo-machinery, turbojet, turbo-fan, prop-fan engines, turbo-prop and turboshaft engines. RAM and SCRAM jet analysis and a brief introduction to related materials and air frame-propulsion interaction. Prerequisite: MEE 418.
3 sem. hrs.

MEE 514. DIRECT ENERGY CONVERSION: Introduction to the principles of direct energy conversion. Irreversible thermodynamics; semiconductors; thermoelectric and photovoltaic devices; magnetohydrodynamics; thermionic devices; fuel cells. Prerequisite: MEE 410.
3 sem. hrs.

MEE 515. CONDUCTION HEAT TRANSFER: Steady state and transient state conduction. Evaluation of temperature fields by formal mathematics and numerical analysis. Emphasis on approximate solution techniques.
3 sem. hrs.

MEE 516. CONVECTION HEAT AND MASS TRANSFER: Development of governing differential equations for convection. Methods of solution including similarity methods, integral methods, and superposition of solutions. Turbulent flow convection; integral methods, eddy diffusivities for heat and momentum. Extensions to mass transfer. Prerequisite: MEE 410 or equivalent.
3 sem. hrs.

MEE 517. RADIATION HEAT TRANSFER: Fundamental relationships of radiation heat transfer. Radiation characteristics of surfaces. Geometric considerations in radiation exchange between surfaces. Emissivity and absorptivity of gases. Introduction to radiative exchange in gases.
3 sem. hrs.

MEE 519. ANALYTICAL DYNAMICS: Dynamical analysis of a system of particles and of rigid bodies; Lagrangian and Hamiltonian formulation of equations of motion; classical integrals of motion; stability analysis of linear and nonlinear systems. Prerequisite: MTH 219 and EGM 202 or equivalent.
3 sem. hrs.

MEE 525. PRINCIPLES OF CORROSION: Application of electrochemical principles, corrosion reactions, passivation, cathodic and anodic protection, stress corrosion, and high-temperature oxidation. Prerequisite: MEE 501.
3 sem. hrs.

MEE 527. AUTOMATIC CONTROL THEORY: Stability and performance of automatic control systems. Classical

methods of analysis including transfer functions, time-domain solutions, root locus and frequency response methods. Modern control theory techniques including state variable analysis, transformation to companion forms, controllability, pole placement, observability and observer systems. Prerequisite: ELE 432 or MEE 435 or equivalent.
3 sem. hrs.

MEE 532. ACOUSTICS: Physics of sound propagation, psychological effects of noise, noise control criteria and regulations, transmission phenomena, acoustics of walls and enclosures, resonators and filters, acoustic properties of materials, acoustic consideration in structural and machine design.
3 sem. hrs.

MEE 533. THEORY OF ELASTICITY: Three-dimensional stress and strain at a point; equations of elasticity in Cartesian and curvilinear coordinates; methods of formulation of equations for solution; plane stress and plane strain; energy formulations; numerical solution procedures. Prerequisite: EGM 303; Corequisite: EGM 503.
3 sem. hrs.

MEE 534. THEORY OF PLATES AND SHELLS: Theory of plates: small and large displacement theories of thin plates; shear deformation; buckling; sandwich plate theory. Thin shell theory: theory of surfaces; thin shell equations in orthogonal curvilinear coordinates; bending, membrane, and shallow shell theories. Prerequisite: EGM 533.
3 sem. hrs.

MEE 535. ADVANCED MECHANICAL VIBRATIONS: Review of undamped, damped, natural and forced vibrations of one and two degrees of freedom systems. Lagrange's equation, eigenvalue/eigenvector problem, modal analysis for discrete and continuous systems. Computer application for multi-degree of freedom, nonlinear problems. Prerequisites: Computer Programming and MEE 319.
3 sem. hrs.

MEE 536. RANDOM VIBRATIONS: Introduction to probability distribution; characterization of random vibrations; harmonic analysis; auto- and cross-

correlation and spectral density; coherence; response to single and multiple loadings; Fast Fourier Transform (FFT); applications in vibrations, vehicle dynamics, fatigue, etc. Prerequisites: Computer Programming and MEE 319. 3 sem. hrs.

MEE 538. INTRODUCTION TO AEROELASTICITY: The study of the effect of aerodynamic forces on a flexible aircraft. Flexibility coefficients and natural modes of vibration. Quasi-steady aerodynamics. Static aeroelastic problems; wing divergence and dynamic aeroelasticity; wing flutter. An introduction to structural stability augmentation with controls. Prerequisite: AEE 501 equivalent. 3 sem. hrs.

MEE 539. THEORY OF PLASTICITY: Fundamentals of plasticity theory including elastic, viscoelastic, and elastic-plastic constitutive models; plastic deformation on the macroscopic and microscopic levels; stress-strain relations in the plastic regime; strain hardening; limit analysis; numerical procedures. Prerequisite: EGM 503 or 533. 3 sem. hrs.

MEE 540. BEARINGS AND BEARING LUBRICATION: Theoretical aspects of lubrication; determination of pressure distribution in bearings from viscous flow theory; application of hydrodynamic and hydrostatic bearing theories to the design of bearings; high-speed bearing design problems; properties of lubricants; methods of testing. 3 sem. hrs.

MEE 541. EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS: Introduction to the mechanical response of fiber-reinforced composite materials with emphasis on the development of experimental methodology. Analytical topics include stress-strain behavior of anisotropic materials, laminate mechanics, and strength analysis. Theoretical models are applied to the analysis of experimental techniques used for characterizing composite materials. Lectures are

supplemented by laboratory sessions in which characterization tests are performed on contemporary composites. Prerequisite: EGM 303. 3 sem. hrs.

MEE 542. ADVANCED COMPOSITES: Materials and processing. Comprehensive introduction to advanced fiber reinforced polymeric matrix composites. Constituent materials and composite processing will be emphasized with special emphasis placed on structure-property relationships, the role of the matrix in composite processing, mechanical behavior and laminate processing. Specific topics will include starting materials, material forms, processing, quality assurance, test methods and mechanical behavior. Prerequisites: MEE 501, MEE 509, or consent of the instructor. 3 sem. hrs.

MEE 543. ANALYTICAL MECHANICS OF COMPOSITE MATERIALS: Analytical models are developed for predicting the mechanical and thermal behavior of fiber-reinforced composite materials as a function of constituent material properties. Both continuous and discontinuous fiber-reinforced systems are considered. Specific topics include basic mechanics of anisotropic materials, micromechanics, lamination theory, free-edge effects, and failure criteria. Prerequisite: EGM 303. 3 sem. hrs.

MEE 544. MECHANICS OF COMPOSITE STRUCTURES: Comprehensive treatment of laminated beams, plates, and sandwich structures. Effect of heterogeneity and anisotropy on bending under lateral loads, buckling, and free vibration are emphasized. Shear deformation and other higher-order theories and their range of parametric application are also considered. Prerequisite: MEE 543 or consent of instructor. 3 sem. hrs.

MEE 545. COMPUTATIONAL METHODS FOR DESIGN: Modeling of mechanical systems and structures,

analysis by analytical and numerical methods, development of mechanical design criteria and principles of optimum design, selected topics in mechanical design and analysis, use of the digital computer as an aid in the design of mechanical elements. Prerequisite: Computer Programming. 3 sem. hrs.

MEE 546. FINITE ELEMENT ANALYSIS I: Fundamental development of the Finite Element Method (FEM), and solution of field problems and comprehensive structural problems, Variational principles and weak-forms; finite element discretization; shape functions; finite elements for field problems; bar, beam, plate, and shell elements; isoparametric finite elements; stiffness, nodal force, and mass matrices; matrix assembly procedures; computer dosing techniques; modeling decisions; program output interpretation. Course emphasis on a thorough understanding of FEM theory and modeling techniques. Prerequisites: MEE 503 or MEE 533. 3 sem. hrs.

MEE 547. FINITE ELEMENT ANALYSIS II: Advanced topics: heat transfer; transient dynamics; nonlinear analysis; substructuring and static condensation; effects of inexact numerical integration and element incompatibility; patch test; frontal solution techniques; selected topics from the recent literature. Prerequisite: MEE 546. 3 sem. hrs.

MEE 548. ENERGY METHODS IN SOLID MECHANICS: Development of fundamental energy principles; virtual displacements, strain energy, Castigliano's theorems, minimum potential energy principles. Applications to engineering problems; redundant structures, buckling, static and dynamic analysis. Prerequisite: MEE 503 or MEE 533. 3 sem. hrs.

MEE 549. THEORY OF ELASTIC STABILITY: Introduction to stability theory; buckling of plates and shells; influence of initial imperfections;

nonlinear analysis: numerical solutions methods. Prerequisite: MEE 533.
3 sem. hrs.

MEE 550. MECHANICAL ENGINEERING PROJECT: Student participation in a departmental research, design, or development project under the direction of a project advisor. The student must show satisfactory progress as determined by the project advisor and present a written report at the conclusion of the project.
1-6 sem. hrs.

MEE 552. BOUNDARY LAYER THEORY: Development of the Prandtl boundary layer approximation in two and three dimensions for both compressible and incompressible flow. Exact and approximate solutions for laminar flows. Unsteady boundary layers. Linear stability theory and transition to turbulence. Empirical and semi-empirical methods for turbulent boundary layers. Higher-order boundary layer theory. Prerequisite: MEE 504 or equivalent.
3 sem. hrs.

MEE 553. COMPRESSIBLE FLOW: Fundamental equations of compressible flow, introduction to flow in two and three dimensions. Two-dimensional supersonic flow, small perturbation theory, method of characteristics, oblique shock theory. Introduction to unsteady one-dimensional motion and shock tube theory. Method of surface singularities. Prerequisite: MEE 504 or equivalent.
3 sem. hrs.

MEE 555. TURBULENCE: Origin, evolution, and dynamics of fully turbulent flows. Description of statistical theory, spectral dynamics, and the energy cascade. Characteristics of wall-bounded and free turbulent shear flows. Reynolds stress models.
3 sem. hrs.

MEE 565. FUNDAMENTALS OF COMBUSTION: Heat of combustion and flame temperature calculations: rate of chemical reaction and Arrhenius relationship: theory of thermal explosions and the concept of ignition delay

and critical mass: phenomena associated with hydrocarbon-air combustion: specific applications of combustion.
3 sem. hrs.

MEE 566. COMBUSTION THEORY: Theory of detonation (Rankine-Hugoniot relationships) and flame propagation rates in pre-gas mixed systems: turbulent flames and the well-stirred reactor; theory of diffusion flames; fuel droplet combustion; steady burning of solid materials, ignition and flame spreading across solid materials.
3 sem. hrs.

MEE 567. SOLAR HEATING ANALYSIS: Topics dealing with energy usage patterns; thermal insulation studies and energy conversion schemes; building heating load calculations; characteristics and measurement of solar radiation; analysis and testing of solar collectors; active and passive solar heating systems; economic trends of solar heating; heat pumps.
3 sem. hrs.

MEE 568. INTERNAL COMBUSTION ENGINES: A study of combustion and energy release processes. Applications to spark and compression ignition, jet, rocket, and gas turbine engines. Special emphasis given to understanding of air pollution problems caused by internal combustion engines. Idealized and actual cycles are studied in preparation for laboratory testing of I.C. engines.
3 sem. hrs.

MEE 569. HEATING AND AIR CONDITIONING: Topics dealing with thermal environments and methods of control. Included are psychometrics, solar radiation, heat transmission through solid boundaries, industrial and residential environments, residential heating and cooling load calculations.
3 sem. hrs.

MEE 570. FRACTURE MECHANICS: Application of the principles of fracture mechanics to fatigue and fracture in engineering structures. Prerequisite: MEE 506 or consent of instructor.
3 sem. hrs.

MEE 575. FRACTURE AND FATIGUE OF METALS AND ALLOYS I: Treatment of the effects of microstructure on the fracture and fatigue of engineering metals and alloys with a special emphasis on static and dynamic brittle and ductile failures and crack initiation. Alloy fracture resistance, fracture toughness, and method to improve fracture behavior will be discussed in detail. Various analytical techniques in the failure analysis of structural components will be presented. Prerequisites: MEE 501, MEE 506 or consent of instructor.
3 sem. hrs.

MEE 576. FRACTURE AND FATIGUE OF METALS AND ALLOYS II: This course will cover the areas of the effects of microstructure on fatigue crack propagation and of environment on fracture and fatigue. This will include fatigue life prediction, damage tolerance approach to component design and microstructural and structural synthesis for optimum behavior. Specific material related aspects of fatigue mechanisms, fracture mechanics approach, and failure analysis will also be covered. Prerequisite: MEE 575 or equivalent.
3 sem. hrs.

MEE 580. PRODUCT AND PROCESS AUTOMATION: General introduction to the modern techniques utilized in mechanical product and manufacturing process design. Topics in the various technologies associated with CAE/CAD/CAM/ CIM.
3 sem. hrs.

MEE 581. COMPUTER-AIDED ENGINEERING: Treatment of topics associated with the initial design, analysis and stimulation phase of the product development process. Development and use of analysis and stimulation tools.
3 sem. hrs.

MEE 582. AUTOMATED DESIGN: Perform activities associated with the detailed design, drafting, and documentation of mechanical parts and components. Address system programming,

MEE 583. AUTOMATED MANUFACTURING: Treatment of topics associated with manufacturing engineering functions and issues in automation. Discuss numerical control, process planning, quality assurance, process simulation, manipulators, and other related technologies. *3 sem. hrs.*

MEE 584. INTEGRATED MANUFACTURING SYSTEMS: Address topics associated with the design, implementation, planning and control of fixed and flexible manufacturing and assembly systems in conjunction with communications and computer technologies. Discuss issues associated with group technology and systems integration. *3 sem. hrs.*

MEE 585. DESIGN FOR PRODUCIBILITY: Concurrent treatment of product design and manufacturing process issues. Application of various methodologies, tools, and evaluation schemes on various product design, manufacturing, and assembly-related activities. *3 sem. hrs.*

MEE 590. SELECTED READINGS: Directed readings in a designated area arranged and approved by the student's faculty advisor and the departmental chair. May be repeated. (A) Materials, (B) Thermal Sciences (C) Fluid Mechanics, (D) Solids Mechanics, (E) Mechanical Design, (F) Intergrated Manufacturing. *1-6 sem. hrs. each*

MEE 595. SPECIAL PROBLEMS IN MECHANICAL ENGINEERING: Special assignments in mechanical engineering subject matter arranged and approved by the student's faculty advisor and the department chair. *1-6 sem. hrs.*

MEE 599. THESIS *1-6 sem. hrs.*

MEE 690. SELECTED READINGS: Directed readings in a designated area arranged and approved by the student's doctoral advisory committee and the departmental chair. May be repeated. (A) Materials, (B) Thermal Sciences, (C) Fluid Mechanics, (D) Solid Mechanics (F) Mechanical Design (F) Integrated Manufacturing. *1-6 sem. hrs. each*

MEE 695. SPECIAL PROBLEMS IN MECHANICAL ENGINEERING: Special assignments in mechanical engineering subject matter arranged and approved by the student's doctoral advisory committee and the department chair. May be repeated. *1-6 sem. hrs.*

MEE 698. D.E. DISSERTATION: An original investigation as applied to mechanical engineering practice. Results must be of sufficient importance to merit publication. *1-15 sem. hrs.*

MEE 699. Ph.D. DISSERTATION: An original research effort which makes a definite contribution to technical knowledge. Result must be of sufficient importance to merit publication. *1-15 sem. hrs.*

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- AHERN, David W. (1977), *Political Science*, Associate Professor—B.A., Southern Connecticut State College, 1970; M.A., University of Maryland, 1972; Ph.D., 1976.
- ALEXANDER, Roberta S. (1969), *History*, Professor—A.B., University of California at Los Angeles, 1964; M.A., University of Chicago, 1966; Ph.D., 1974.
- ANDERSON, Rev. William P. (1968), *Religious Studies*, Professor—A.B., Bloomfield College, 1961; B.D., Princeton Theological Seminary, 1964; Th.D., 1968.
- ARONS, Peter L. (1965), *English*, Associate Professor—A.B., New York University, 1957; M.A., Yale University, 1958; Ph.D., 1964.
- AUGUST, Eugene R. (1966), *English*, Professor—B.A., Rutgers University, 1958; M.A., University of Connecticut, 1960; Ph.D., University of Pittsburgh, 1965.
- BAJPAI, Praphulla K. (1964), *Biology*, Professor—B.V. Sc. & A.H., Agra University, 1958; M.V. Sc., 1960; M. Sc., Ohio State University, 1963; Ph.D., 1965.
- BEDARD, Bernard J. (1962), *English*, Professor—A.B., University of Notre Dame, 1949; M.A., University of Michigan, 1950; Ph.D., 1959.
- BERNEY, Rex L. (1978), *Physics*, Associate Professor—B.S., University of Missouri at Columbia, 1971; M.S., 1973; Ph.D., 1978.
- BIERS, David W. (1976), *Psychology*, Associate Professor—B.A., Lafayette College, 1966; M.S., Northwestern University, 1968; Ph.D., 1970.
- BLATT, Stephen J. (1971), *Communication*, Associate Professor—B.A., Morehead State University, 1964; M.A., Ohio University, 1967; Ph.D., 1969.
- BRANICK, Vincent P. (1979), *Arts and Sciences*, Professor—B.A., Chaminade College of Honolulu, 1963- M.A., Catholic University of America, 1964; S.T.B., University of Fribourg, 1966; S.T.L., 1969, D.Phil., 1971; S.S. L., Pontifical Biblical Institute, Rome, 1972; Drs. Gregorian University, Rome, 1972; SS.D., Pontifical Biblical Institute, Rome, 1975.
- BREITWISCH, Randall J. (1988), *Biology*, Associate Professor—B.S. University of Miami, 1973; M.S., 1977; M.S. University of Michigan, 1982; Ph.D., University of Miami, 1987.
- BURKY, Albert J. (1973), *Biology*, Professor—B.A., Hartwick College, 1964; Ph.D., Syracuse University, 1969.
- BUTTER, Eliot J. (1971), *Psychology*, Professor—B.A., Brooklyn College, 1965; M.A., 1969; Ph.D., University of Massachusetts, 1971.
- CHANTELL, Charles J. (1965), *Biology*, Associate Professor—B.S., University of Illinois, 1961; M.S., University of Notre Dame, 1963; Ph.D., 1965.
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- CUSELLA, Louis P. (1985), *Communication*, Professor—B.A., Kent State University, 1972; M.A., Ohio State University, 1974; Ph.D., Purdue University, 1978.
- DAPOLITO, Frank J. (1970), *Psychology*, Professor—B.A., Bowling Green State University, 1959; Ph.D., Indiana University, 1966.
- EGGEMEIER, F. Thomas (1986), *Psychology*, Professor—B.A., University of Dayton, 1967; M.A., Ohio State University, 1969; Ph.D., 1971.
- EID, Leroy V. (1961), *History*, Professor—B.S. in Ed., University of Dayton, 1953; M.A., St. John's University, 1958; M.A., University of Toronto, 1968; Ph.D., St. John's University, 1961.
- ELOE, Paul W. (1980), *Mathematics*, Professor—B.A., Vanderbilt University, 1975; M.S., University of Missouri-Rolla, 1977; Ph.D. 1980.
- ELVERS, Greg C. (1990), *Psychology*, Assistant Professor—B.S., Purdue University, 1984; B.A., 1985; M.S., 1987; Ph.D., 1989.
- ERDEI, John E. (1983), *Physics*, Associate Professor—B.S., Cleveland State University, 1973; M.S., 1976; Ph.D., University of Cincinnati, 1983.
- FINE, Mark A. (1984), *Psychology*, Professor—B.A., Cornell University, 1979; M.A., The Ohio State University, 1981; Ph.D., 1983.
- FOGEL, Norman J. (1971), *Political Science*, Associate Professor—B.S., Millersville State College, 1960; M.A., University of Delaware, 1968; Ph.D., Ohio State University, 1975.
- FOX, B. Lawrence (1966), *Chemistry*, Professor—B.S., John Carroll University, 1962; Ph.D., Ohio State University, 1966.
- FRATINI, Albert V. (1967), *Chemistry*, Professor—B.S., University of Rhode Island, 1960; Ph.D., Yale University, 1966.
- FRIESE, Carl F. (1992), *Biology*, Assistant Professor—B.S., University of Connecticut, 1982; M.S. University of Rhode Island, 1984; Ph.D. Utah State University, 1991.
- FROST, Rev. William P. (1967), *Religious Studies*, Professor—Drs. Th., Carolus Magnus University (Netherlands), 1961; M.A., Loyola University, 1966.
- GANTNER, Thomas E. (1966), *Mathematics*, Professor—B.S., University of Dayton, 1962; M.S., Purdue University, 1964; Ph.D., 1966.
- GEIGER, Donald R., S.M. (1964), *Biology*, Professor—B.S., University of Dayton, 1955; M.S., Ohio State University, 1960; Ph.D., 1963.
- GORTON, Robert B. (1969), *Mathematics*, Associate Professor—B.S., Illinois Institute of Technology, 1964; 1966; Ph.D., 1970.
- GRAHAM, Thomas P. (1964), *Physics*, Professor—B.S., Providence College, 1956; Ph.D., Iowa State University, 1967.

- HARWOOD, Phillip J. (1966), *Communication*, Associate Professor—B.S., Butler University, 1960; M.S., 1961; Ph.D., Ohio University, 1972.
- HATER, Robert J. (1981), *Religious Studies*, Professor—B.A., Athenaeum of Ohio, 1957; M.A., 1959; Ph.D., St. John's University, 1967.
- HEFT, Rev. James L., S.M. (1978), *Religious Studies*, Professor—B.A., B.S. Ed., University of Dayton, 1966; M.A., University of Toronto, 1971; Ph.D., 1977.
- HENNINGER, Francis J. (1965), *English*, Professor—B.A., St. John's University, 1956; M.A., University of Notre Dame, 1958; M.A., University of Pennsylvania, 1962; Ph.D., 1965.
- HERBENICK, Raymond M. (1968), *Philosophy*, Professor—B.A., Duquesne University, 1964; M.A., DePaul University, 1965; M.B.A., University of Pittsburgh, 1968; Ph.D., Georgetown University, 1968.
- HIGGINS, Aparna W. (1984), *Mathematics*, Associate Professor—B.Sc., University of Bombay, 1978; M.S., University of Notre Dame, 1980; Ph.D., 1983.
- HUNNICUTT, Sarah S. (1990), *Chemistry*, Assistant Professor—B.A., Duke University, 1983; M.S., University of Utah, 1986; Ph.D., University of Cincinnati, 1990.
- INSCHO, Frederick R. (1976), *Political Science*, Assistant Professor—A.B., University of Detroit, 1968; M.A., State University of New York at Buffalo 1972; Ph.D., 1976.
- ISLAM, Muhammad N. (1985), *Mathematics*, Associate Professor—B.S., University of Dhaka, Bangladesh, 1972; M.S., Carleton University, Ottawa, 1980; Ph.D., Southern Illinois University, 1985.
- KEARNS, Robert J. (1984), *Biology*, Associate Professor—B.S., Washington State University, 1968; M.S., 1975; Ph.D., 1978; M.T. (ASCP), 1971.
- KEIL, Robert G. (1969), *Chemistry*, Professor—B.S., Villanova University, 1963; Ph.D., Temple University, 1967.
- KEPES, Joseph J. (1962), *Physics*, Professor—B.S., Case Institute of Technology, 1953; Ph.D., University of Notre Dame, 1958.
- KERNS, Gerald E. (1967), *Political Science*, Professor—B.A., University of Wichita, 1961; Ph.D., Indiana University, 1969.
- KIMBLE, Charles E. (1973), *Psychology*, Professor—B.A., Baylor University, 1966; M.A., 1969; Ph.D., University of Texas 1972.
- KNACHEL, Howard C. (1972), *Chemistry*, Professor—B.S., University of Dayton, 1963; M.S., Ohio State University, 1969; Ph.D., 1971.
- KORTE, John R. (1973), *Psychology*, Associate Professor—B.A., University of California, Berkeley, 1967; M.S., Purdue University, 1969; Ph.D., 1973.
- KUNKEL, Joseph C. (1964), *Philosophy*, Professor—A.B., Loyola University, 1958; A.M., 1962; Ph.D., St. Bonaventure University, 1968.
- LAIN, Laurence B. (1976), *Communication*, Associate Professor—B.S., Indiana State University, 1969; M.A., Ball State University, 1973; Ph.D., Ohio State University, 1984.
- LANG, Joseph E. (1981), *Computer Science*, Associate Professor—A.B., Thomas More College, 1964; M.S., University of Illinois, 1965; Ph.D. 1970.
- LAPITAN, Antonio E. (1969), *Political Science*, Professor—A.B., University of the Philippines, 1954; M.A., Lehigh University, 1957; Ph.D., University of Oregon, 1968.
- L'HEUREUX, Conrad E. (1970), *Religious Studies*, Professor—B.A., St. Paul's College, 1962; M.A., Catholic University of America, 1966; Ph.D., Harvard University, 1972.
- MCCLOSKEY, John W. (1965), *Mathematics*, Professor—B.S., University of Dayton, 1960; M.S., Michigan State University, 1962; Ph.D., 1965.
- McDOUGALL, Kenneth J. (1966), *Biology*, Professor—B.A., Northland College, 1957; M.S., Marquette University, 1959; Ph.D., Kansas State University, 1964.
- MARRE, Kitayun E. (1966), *English*, Professor—B.A., University of Bombay, 1958; M.A., University of Bombay, 1960; Ph.D., State University of New York at Buffalo, 1966.
- MARRE, Louis A. (1965), *English*, Associate Professor—A.B., University of Notre Dame, 1961; M.A., 1963; Ph.D., 1972.
- MEANS, Michael H. (1963), *English*, Associate Professor—B.A., Wisconsin State College, 1955; M.A., Ohio State University, 1957; Ph.D., University of Florida, 1963.
- MINER, George K. (1976), *Physics*, Professor—A.B., Thomas More College, 1958; M.S., University of Notre Dame, 1960; Ph. D., University of Cincinnati, 1965.
- MONASTERIO, Xavier O. (1966), *Philosophy*, Professor—B.A., Institute Oriente, Mexico, 1944; M.A., Ysleta College, 1951; Ph.D., Universite de Paris, 1964.
- MORLAN, Donald B. (1977), *Communication*, Professor—B.S., Indiana State University, 1962; M.S., 1965; Ph.D., Purdue University, 1969.
- MORROW, Gary W. (1988), *Chemistry*, Associate Professor—B.A., Ohio State University, 1984; Ph.D., 1988.
- MUSHENHEIM, Harold G., (1965), *Mathematics*, Associate Professor—B.S., University of Dayton, 1955; M.A., University of Cincinnati, 1960; Ph.D., 1963.
- NELSON, Peter B. (1979), *Political Science*, Assistant Professor—B.S., Florida State University, 1969; B.S., Florida International University, 1973; M.S.M., 1975; Ph.D., University of Mississippi, 1982.
- O'HARE, J. Michael (1966), *Physics and Electro-Optics*, Professor—B.S., Loras College, 1960; M.S., Purdue University, 1962; Ph.D., State University of New York at Buffalo, 1966.
- PALERMO, Patrick F. (1971), *History*, Professor—A.B., Fordham University, 1966; M.A., State University of New York at Stony Brook, 1967; Ph.D., 1973.
- PATROUCH, Joseph F. (1964), *English*, Professor—A.B., University of Cincinnati, 1958; M.A., 1960; Ph.D., University of Wisconsin, 1965.

- PEDROTTI, Leno M. (1987), *Physics and Electro-optics*, Assistant Professor—B.A., Wright State University, 1981; Ph.D., University of New Mexico, 1986.
- POLZELLA, Donald J. (1972), *Psychology*, Professor—B.A., University of Rochester, 1967; M.A., Bucknell University, 1969; Ph.D., University of Michigan, 1974.
- RHEE, Tong-Chin (1967), *History*, Professor—B.A., Seoul National University, 1959; M.P.A., School of Public Administration, Seoul National University, 1961; M.A., Lehigh University, 1962; Ph.D., Clark University, 1967.
- RICHARDS, William M. (1970), *Philosophy*, Associate Professor—B.A., LeMoyne College, 1966; Ph.D., Georgetown University, 1970.
- ROBERTS, William P. (1980), *Religious Studies*, Professor—B.A., Fordham University, 1955; M.A., 1957; Ph.L., Loyola Seminary, 1956; S.T.L., Weston College School of Theology, 1963; Ph.D., Marquette University, 1968.
- ROBINSON, James D. (1982), *Communication*, Associate Professor—B.A., University of the Pacific, 1978; M.A., West Virginia University, 1979; Ph.D., Purdue University, 1982.
- ROWE, John J. (1977), *Biology*, Professor—B.S., Colorado State University, 1967; M.S., Arizona State University, 1971; Ph.D., University of Kansas Medical Center, 1975.
- RUFF, Lawrence A. (1960), *English*, Associate Professor—B.S., University of Dayton, 1958; M.A., Catholic University of America, 1959; Ph. D., Ohio State University, 1968.
- SINGER, Sanford S. (1972), *Chemistry*, Professor—B.S., Brooklyn College, 1962; M.S., University of Michigan, 1964; Ph.D., 1967.
- SKILL, Thomas D. (1984), *Communication*, Associate Professor—B.A., State University of New York at Buffalo, 1978; M.A., 1980; Ph.D., 1984.
- STEINLAGE, Ralph C. (1966), *Mathematics*, Professor—B.S., University of Dayton, 1962; M.S., Ohio State University, 1963; Ph.D., 1966.
- THOMPSON, Teresa L. (1985), *Communication*, Professor—B.A. University of Wisconsin, 1975; M.A., Purdue University, 1976; Ph. D., Temple University, 1980.
- TIBBETTS, Paul E. Jr. (1969), *Philosophy*, Professor—A.E., Worcester Junior College, 1959; B.A., Clark University, 1964; M.A., Boston University, 1965 Ph.D., Purdue University, 1973.
- TSONIS, Panagiotis A. (1989), *Biology*, Associate Professor — B.S., Patras University, 1977; M.S., Nagoya University, 1980; Ph.D., 1983.
- ULRICH, Lawrence P. (1964), *Philosophy*, Professor—A.B., Catholic University of America, 1961; M.A., 1962; M.Ed., Xavier University, 1964; Ph.D., University of Toronto, 1972.
- VESPER, Mary J. (1982), *Biology*, Associate Professor—B.A., Thomas More College, 1973; M.S., Ohio State University, 1975; Ph.D., 1978.
- WALLACE, Samuel P. (1982), *Communication*, Associate Professor—B.A., Ohio State University, 1975; M.A., 1979; Ph.D., 1985.
- WATTERS, Kathleen B. (1989), *Communication*, Assistant Professor — B.S., University of Minnesota, 1976; M.A., 1979; Ph.D., 1988.
- WEATHERLY, Michael (1968), *Communication*, Assistant Professor—B.A. Stephen F. Austin State College, 1958; M.A., Bowling Green State University 1961; Ph.D., Ohio State University, 1972.
- WHITAKER, Leslie A. (1990), *Psychology*, Associate Professor—B.S., Northeastern State College, 1965; M.A.T., University of Montana, 1971; M.S., Pennsylvania State University, 1973; Ph.D., 1975.
- WINSLOW, Leon E. (1981), *Computer Science*, Professor—B.S., Marquette University, 1956; M.S. 1960; Ph.D., Duke University, 1965.
- YANEY, Perry P. (1965), *Physics and Electro-optics*, Professor—B.S.E.E., University of Cincinnati 1954, M.S., 1957; Ph.D., 1963.
- YODER, Donald D. (1989), *Communication*, Associate Professor — B.S., Iowa State University, 1973; M.A., University of Nebraska-Lincoln, 1975; Ph.D., Ohio State University, 1982.
- ZEMBATY, Jane S. (1975), *Philosophy*, Professor—B.A., State University of New York at Buffalo, 1971; M.A., Georgetown University, 1974; Ph.D., 1976.

**BUSINESS ADMINISTRATION
GRADUATE FACULTY**

- AGERWAL, Ritu (1988), *MIS and Decision Sciences*, Associate Professor—B.A., Delhi University, 1982; M.S., Syracuse University, 1987; Ph.D., 1988.
- AMSDEN, Robert T. (1978), *MIS and Decision Sciences*, Associate Professor—B.A., University of New Hampshire, 1960; M.S., Rutgers, The State University, 1964; Ph.D., 1969.
- BELADI, Hamid (1988), *Economics and Finance*, Professor—M.S., Utah State University, 1979; Ph.D., 1983.
- BERGER, Robert M. (1964), *Management and Marketing*, Assistant Professor—B.S., University of Dayton, 1960; M.A., Ohio University, 1963; J.D., Chase School of Law, 1970.
- BICKFORD, Deborah J. (1988), *Management and Marketing*, Associate Professor—B.A., State University of New York, 1974; M.S.B.A., University of Massachusetts, 1976; Ph.D., 1980.
- BOHLEN, George A. (1980), *MIS and Decision Sciences*, Associate Professor—B.S.M. E., Clemson University, 1958; M.S.I.E., Purdue University, 1963; M.S.B.A., George Washington University, 1968; Ph.D., Purdue University, 1973.
- BRADY, Thomas J. (1981), *Accounting*, Associate Professor—B.S., New York University, 1966; M.B.A., Adelphi University, 1968; Ph.D., Purdue University, 1976.
- BURROWS, Ron J. (1981), *Accounting*, Associate Professor—B.S., Northern Illinois University, 1965; M.S., 1968; Ph.D., Pennsylvania State University, 1980.
- CHEN, Carl R. (1977), *Economics and Finance*, Professor—B.A., National Taiwan University, 1969; M.S., Auburn University, 1973; Ph.D., University of Georgia, 1977.
- CLARK, Willard C., Jr. (1963), *Accounting*, Associate Professor—B.S., University of Dayton, 1959; M.B.A., Miami University, 1960; C.P.A., Ohio, 1962.
- DE, Prabuddha (1987), *MIS and Decision Sciences*, Std. Register-Sherman Distinguished Professor—B.S., University of Calcutta, 1968; M.S., Pennsylvania State University, 1975; Ph.D., Carnegie-Mellon University, 1979.
- DeCONINCK, James B. (1992), *Management and Marketing*, Assistant Professor—B.S.B.A., University of Missouri, 1981; M.B.A. Central Missouri State University, 1984; Ph.D. University of Arkansas, 1988.
- DEHLER, Gordon E. (1988), *Management and Marketing*, Assistant Professor—B.A., University of Northern Colorado, 1974; M.A., Ohio State University, 1977; M.A.I.R., University of Cincinnati, 1986; Ph.D. 1990.
- DUNNE, Edward J. (1982), *Decision Sciences*, Professor—B.S., St. Louis University, 1962; M.S., Air Force Institute of Technology, 1964; Ph.D., University of Illinois, 1971.
- ELEY, Marion J. (1961), *Accounting*, Associate Professor—B.S., University of Dayton, 1959; M.B.A., Xavier University, 1964; C.P.A., Ohio, 1966.
- EMMELHAINZ, Margaret A. (1986) *Management and Marketing*, Associate Professor—B.A., Trinity University, 1973; M.S., Air Force Institute of Technology, 1979; Ph.D., Ohio State University, 1986.
- FERRATT, Thomas W. (1986), *MIS and Decision Sciences*, Professor—B.B.A., University of Notre Dame, 1968; M.B.A. Ohio State University, 1973; Ph.D. 1974.
- FIORITI, Andrew A. (1965), *Accounting*, Associate Professor—B.S., University of Scranton, 1956; M.B.A., University of Detroit, 1958; C.P.A., New Jersey, 1964.
- FRASCA, Ralph R. (1972), *Economics and Finance*, Associate Professor—B.A., C.W. Post College, 1967; M.A., Indiana University, 1971; Ph.D., 1975.
- GEARY, K. Michael (1976), *Accounting*, Associate Professor—B.S., Indiana University, 1969; M.B.A., Miami University, 1974; Ph.D., University of Cincinnati, 1982; C.P.A., Illinois, 1975; C.P.A., Ohio, 1976.
- GHOSH, Jayabrata (1983), *MIS Decision Sciences*, Associate Professor—B.T., Indiana Institute of Technology, 1977; M.S., University of Arkansas, 1981; Ph.D., 1983.
- GOMOLKA, Eugene G. (1986), *Management and Marketing*, Professor—B.S., Carnegie-Mellon University, 1967; M.B.A., University of Pittsburgh, 1968; Ph. D., State University of New York at Buffalo, 1974.
- GOULD, Sam (1985), *Management and Marketing*, Professor—B.S., Ohio University, 1964; M.B.A., University of Colorado, 1970; Ph.D., Michigan State University, 1975.
- GUSTAFSON, Elizabeth F. (1983), *Economics and Finance*, Associate Professor—B.A., Duke University, 1970; Ph.D., University of North Carolina, 1974.
- HADLEY, Lawrence H. (1977) *Economics and Finance*, Associate Professor—B.A., Rutgers University, 1967; M.A., University of Connecticut, 1969; Ph. D., 1975.
- LEWIS, William F. (1980), *Management and Marketing*, Associate Professor—B.A., Spring Arbor College, 1967; M.B.A., Michigan State University, 1969; Ph.D., University of Cincinnati, 1976.
- MERENSKI, J. Paul (1976), *Management and Marketing*, Associate Professor—B.S., Wright State University, 1971; M.B.A., 1972; Ph.D., University of Cincinnati, 1982
- MILLER, Richard L. (1968), *Management and Marketing*, Associate Professor—B.S., Ohio State University, 1947; M.B.A., 1959; Ph.D., University of Cincinnati, 1981.

- MILLER, Van V. (1988), *Management and Marketing*, Assistant Professor—B.A., University of Kansas, 1970; M.B.A. University of Missouri, 1975; M.A., University of New Mexico, 1981; Ph.D., 1984.
- MOHAN, Nancy (1987), *Economics and Finance*, Associate Professor—B.A., Indiana University, 1975; M.B.A., Wright State University, 1977; Ph.D. University of Cincinnati, 1986.
- OUMLIL, Abderrahman B. (1983), *Management and Marketing*, Associate Professor—B.S., Southwest Missouri State University, 1976; M.B.A., University of Arkansas, 1977; Ph.D., 1983.
- POPKEN, Douglas A. (1991), *MIS and Decision Sciences*, Assistant Professor—B.S. Cornell University, 1980; M.Eng., 1981; M.S., University of California, Berkeley, 1985; Ph.D., 1988.
- RAPP, John E. (1972), *Economics and Finance*, Professor—B.A., University of Missouri, 1959; M.A., 1960; Ph.D., 1964.
- ROEHM, Harper A. (1992), *Accounting*, Professor—B.A., Depauw University, 1957; M.B.A. Indiana University, 1963; CPA, Indiana and Ohio, 1964; D.B.A. Florida State University, 1972.
- ROSENZWEIG, Kenneth Y. (1981), *Accounting*, Associate Professor—B.A., University of Texas, 1965; M.B.A., University of Houston, 1968; Ph.D., Michigan State University, 1977.
- SCHENK, Joseph A. (1980), *Management and Marketing*, Associate Professor—B.B.A., University of Kentucky, 1970; M.B.A., Kent State University, 1972; D.B.A., 1976.
- SEKELY, William S. (1976), *Management and Marketing*, Associate Professor—B.S., Allegheny College, 1966; M.B.A., Case Western Reserve, 1970; D.B.A., Kent State University, 1975.
- SINHA, Atish P. (1991), *MIS and Decision Sciences*, Assistant Professor—B.S., University of Calcutta, 1980; B.T., 1984; M.T., University of Calcutta, 1986; Ph.D., University of Pittsburgh, 1980.
- SMITH, David B. (1992), *Accounting*, Ernst and Young Faculty Scholar, Professor—B.A., Carleton College, 1970; M.B.A. University of Pennsylvania, 1973; Ph.D. University of Illinois, 1979.
- STICK, Henry H. (1975), *Economics and Finance*, Distinguished Service Professor—B.S., U.S. Military Academy, 1945; M.B.A., University of Pennsylvania, 1951; Ph.D., Ohio State University, 1957.
- STILWELL, C. Dean (1990) *Management and Marketing*, Assistant Professor—B.S., Virginia Polytechnic Institute and State University, 1977; M.B.A., 1979; Ph.D. Georgia Institute of Technology, 1993.
- STOCK, Richard (1986), *Economics and Finance*, Assistant Professor—B.A., University of Colorado, 1977; M.A., 1980; Ph.D. 1986.
- TEWARI, Harish C. (1975), *Management and Marketing*, Associate Professor—B.B.A., Delhi University, 1963; M.B.A., Central Michigan University, 1969; M.A., University of Cincinnati 1974; Ph.D., 1977.
- VLAHOS, George E. (1978), *MIS and Decision Sciences*, Professor—B.S., University of Illinois Urbana, 1964; M.S., Southern Illinois University, 1967; Ph.D., University of Northern Colorado, 1974.
- VORHERR, Phillip H. (1980), *Accounting*, Associate Professor—B.B.A., University of Cincinnati, 1964; M.B.A., 1965; Ph.D., 1975.
- WEILER, John E. (1967), *Economics and Finance*, Professor—B.A., University of Cincinnati, 1960; M.A., 1961; Ph.D., 1973.
- WELLS, Charles E. (1984), *MIS and Decision Sciences*, Professor—A.B., Harvard University, 1976; M.B.A., Miami University, 1977; Ph.D., University of Cincinnati, 1982.
- WINGER, Bernard J. (1966), *Economics and Finance*, Associate Professor—B. S., Xavier University, 1959; M.A., University of Cincinnati, 1960; C.P.A., Ohio, 1965.
- YATES; Rebecca M.J. (1980), *Management and Marketing*, Associate Professor—B.B.A., University of Cincinnati, 1973; M.B.A., 1975; Ph.D., 1980.
- YOUNG, Saul (1983), *MIS and Decision Sciences*, Associate Professor—B.A., University of Texas, 1962; M.S., University of Wisconsin, 1969; Ph.D., Stanford University, 1975.

EDUCATION
GRADUATE FACULTY

- ANDERSON, Gordon S. (1969), *Teacher Education*, Professor—B.A., Bethany College, 1953; M.S., State University of New York, 1959; Ed.D., Case Western Reserve University, 1969.
- BENZ, Carolyn R. (1990), *Educational Administration*, Associate Professor—B.A., Indiana University, 1964; M.A., 1967; Ed.D., University of Akron, 1980.
- BIDDLE, James (1990) *Teacher Education*, Associate Professor—B.A., Bob Jones University, 1968; M.Ed., University of Cincinnati, 1970; Ph.D., Ohio State University, 1973.
- BRITT, John F. (1966), *Teacher Education*, Professor—B.A., St. Paul Seminary, 1950; M.A., St. Louis University, 1954; Ph.D., 1962.
- CARLSEN, Roger N. (1981), *Teacher Education*, Assistant Professor—B.S. Ed., Northern Illinois University, 1967; M.S. Ed., Chicago State University, 1972; Ed.D., Western Michigan University, 1979.
- DIETHORN, Bernard C., S.M. (1966), *Counselor Education and Human Services*, Professor—B.A., University of Dayton, 1942; M.A., Western Reserve University, 1952; Ed.D., 1966.
- DREES, Doris A. (1956), *Physical and Health Education*, Professor—B.S., University of Dayton, 1954; M.A., Ohio State University, 1959; Ph.D., University of Iowa, 1968.
- DRURY, William R. (1984), *Educational Administration*, Associate Professor—B.S., University of Dayton, 1958; M.S., 1962; Ed.D., Wayne State University, 1971.
- EVANS, James H. (1981), *Counselor Education*, Associate Professor—B.A., Ohio Wesleyan University, 1961; M.A., Kent State University, 1964; Ed.D., Indiana University, 1971.
- FRERICKS, Donald J. (1978), *Educational Administration*, Associate Professor—B.S., University of Dayton, 1956; M.A., Miami University, 1958; Ph.D., Ohio State University, 1970.
- FUCHS, Gordon E. (1967), *Teacher Education*, Professor—B.S., University of Wisconsin, 1958; M.S., 1961; Ph.D., Ohio State University, 1974.
- GAY, James E. (1968), *Teacher Education*, Professor—B.A., Ohio University, 1951; M.A., University of Wisconsin, 1956; D.Ed., University of Maryland, 1972.
- GEIGER, John O. (1970), *Teacher Education*, Professor—B.A., Marquette University, 1966; Ph.D., 1972.
- GOLDFINE, Bernard D. (1990), *Physical and Health Education*, Assistant Professor—B.A., University of California, Santa Barbara, 1975; M.A., University of Southern California, 1985; Ph.D., 1988.
- HARAWA, Bernard A. (1977), *Educational Administration*, Associate Professor—Dip. Ed., Stranmillis College, Belfast, Ireland, 1961; B.S.Ed., University of Dayton, 1965; M.S.Ed., 1967; Ed.D., Teachers College, Columbia University, 1974.
- HART, Patricia M. (1989), *Teacher Education*, Assistant Professor—B.S., University of Dayton, 1973; M.S., 1983; Ph.D., The Ohio State University, 1989.
- HOPFENGARDNER, Jerrold D. (1978), *Educational Administration*, Professor—B.S., University of Dayton, 1959; M.Ed., Miami University, 1961; Ph.D., Ohio State University, 1970.
- JOSEPH, Ellis A. (1961), *Teacher Education*, Professor—A.B., University of Notre Dame, 1955; M.A., 1956; Ph.D., 1962. L.H.D. (Honorary), College of Mt. St. Joseph, 1989.
- LASLEY, Thomas J., II (1983), *Teacher Education*, Professor—B.S., Ohio State University, 1969; M.A., 1972; Ph.D., 1978.
- LAUBACH, Lloyd L. (1980), *Physical and Health Education*, Associate Professor—B.S., Central State University, Edmond, Oklahoma, 1961; M.S., University of Oregon, 1962; Ph.D., Ohio State University, 1970.
- LAVANCHE, James B. (1957), *Physical and Health Education*, Professor Emeritus—B.A., Emory and Henry College, 1948; M.S., West Virginia University, 1952.
- LEONARD, Mary T. (1956), *Physical and Health Education*, Associate Professor—B.A., Radcliffe College, 1948; M.S., MacMurray College, 1951; D.Ed., Boston University, 1960.
- MATCZYNSKI, Thomas J. (1987), *Educational Administration*, Professor—B.S., University of Dayton, 1964; M.Ed., 1968; Ph.D., Ohio University, 1971.
- MCCORMICK, Roger D. (1981), *Counselor Education*, Associate Professor—B.S.Ed., Miami University, 1949; M.A., Ohio State University, 1957; Ph.D., 1969.
- MOULIN, Eugene K. (1968), *Counselor Education and Human Services*, Professor—B.A., Mount Union College, 1956; M.E., Kent State University, 1959; Ph.D., University of Toledo, 1968.
- OVERLY, Donald E. (1989), *Educational Administration*, Assistant Professor—B.S., The Ohio State University, 1956; M.S. University of Dayton, 1963; Ed.D., Indiana University, 1968.
- RAISCH, C. Daniel (1991), *Educational Administration*, Assistant Professor—B.S., Wilmington College, 1961; M.A., Wittenberg University, 1966; Ph.D., Miami University, 1973.
- REVERE Arnie L. (1981), *Counselor Education*, Associate Professor—B.S., Central State University, 1957; M.Ed., Miami University, 1970; Ph.D., 1985.
- ROGUS, Joseph F. (1981), *Educational Administration*, Professor—B.S., University of Dayton, 1960; M.Ed.,

- Miami University, 1962; Ph.D., 1968.
- ROOT, Darrell K. (1987), *Educational Administration*, Assistant Professor—B.S., Miami University, 1950; M.Ed., The Ohio State University, 1957; Ph.D., The Ohio State University, 1971.
- ROWLEY, James B. (1989), *Teacher Education*, Assistant Professor—B.S., University of Dayton, 1969; M.Env., Miami University, 1975; Ph.D., The Ohio State University, 1989.
- RUETH, Thomas W. (1987), *Counselor Education and Human Services*, Associate Professor—B.S., University of Dayton, 1963; M.A., 1968, Ph.D., Loyola University, 1973.
- SCHLEPPI, John R. (1963), *Physical and Health Education*, Professor—B.S., Ohio State University, 1961; M.B.A., 1963; Ph.D., 1972.
- SHUGARMAN, Sherrie L. (1983), *Teacher Education*, Associate Professor—B.Ed., University of Toledo, 1975; M.Ed., 1977; Ph.D., Claremont Graduate School, 1983.
- SMITH, Pamela G. (1990), *Counselor Education and Human Services*, Assistant Professor—B.A., University of Cincinnati, 1975; M.Ed., 1977; Ed.D., 1980.
- SUDZINA, Mary R. (1988), *Teacher Education*, Assistant Professor—B.S., Virginia Commonwealth University, 1970; M.A., Villanova University, 1974; Ph.D., Temple University, 1987.
- TALBERT-JOHNSON, Carolyn (1991), *Teacher Education*, Assistant Professor—B.A., Ohio Dominican College, 1976; M.A., Ohio State University, 1978; Ph.D., Ohio State University, 1991.
- WATRAS, Joseph (1979), *Teacher Education*, Professor—B.A., Boston University, 1965; M.Ed., University of Hawaii, 1969; Ph.D., Ohio State University, 1972.
- WEAVER, Roberta B. (1978), *Teacher Education*, Assistant Professor—B.Sc. in Ed., Ohio State University, 1960; M.Sc., in Ed., University of Cincinnati, 1966; Ed.D., 1982.
- ZAHNER, Mary A. (1982), *Teacher Education*, Assistant Professor—B.F.A., Ohio University, 1960; M.A., 1969; Ph.D., The Ohio State University, 1987.

ENGINEERING
GRADUATE FACULTY

- BECKER, Roger J. (1988), *Electro-Optics*, Associate Professor—B.A., Lake Forest College, 1967; M.S., Massachusetts Institute of Technology, 1972, Ph.D., Thomas Jefferson University, 1976.
- BOEHMAN, Louis I. (1967), *Mechanical and Aerospace Engineering*, Professor—B.S.M.E. University of Dayton, 1960; M.S.M.E., Illinois Institute of Technology, 1963, Ph.D., 1967; Reg. Prof. Engr.
- BOGNER, Fred K. (1969), *Civil Engineering and Engineering Mechanics*, Professor—B.S.C.E., Case Institute of Technology, 1961; M.S.E. Mech., Case Institute of Technology, 1964; Ph.D., 1967.
- BRENDEL, Michael (1991), *Aerospace Engineering*, Assistant Professor—B.S. Clemson University, 1981; M.S., 1983; Ph.D., University of Notre Dame, 1986.
- BROCKMAN, Robert A. (1984), *Mechanical and Aerospace Engineering*, Associate Professor—B.S.M.E., Carnegie-Mellon University, 1973; M.M.E., University of Dayton, 1974; Ph.D., 1979.
- CHARTOFF, Richard P. (1981), *Materials Engineering*, Professor—B.S., Case Western Reserve, 1961; M.S.E., Princeton, 1962; M.A., 1965; Ph.D., 1968.
- CHUANG, Henry N. (1965), *Mechanical Engineering*, Professor—B.S., National Taiwan University, 1958; M.S., University of Maryland, 1962; Ph.D., Carnegie Institute of Technology, 1966. Reg. Prof. Engr.
- DANIELS, Malcolm W. (1987), *Electrical Engineering*, Assistant Professor—B.S., University of Strathclyde, 1979; Ph.D., 1982.
- DEEP, Ronald (1989), *Engineering Management and Systems*, Associate Professor—B.S., U.S. Air Force Academy, 1960; M.S.E., Purdue University, 1970; Ph.D., Florida State University, 1976.
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- EBELING, Charles E. (1988), *Engineering Management and Systems*, Associate Professor—B.S., University of Pittsburgh, 1965; M.S., Air Force Institute of Technology, 1969; Ph.D., Ohio State University, 1973.
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- EVERS, Anthony J. (1966), *Electrical Engineering*, Associate Professor—B.E.E., University of Dayton, 1953; M.S.E.E., University of Notre Dame, 1955; Reg. Prof. Engr.
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- FITZ, Raymond L., S.M. (1969), *Electrical Engineering and Engineering Management*, Professor—B.E.E., University of Dayton, 1964; M.S., Polytechnic Institute of Brooklyn, 1967; Ph.D., 1970.
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- ROGERS, Dana B. (1982), *Electrical Engineering and Electro-Optics*, Professor—B.S.E.E., Arizona State University, 1962; M.S.E.E., Air Force Institute of Technology, 1969; Ph.D., University of Dayton, 1978.
- RYCKMAN, Seymour J. (1959), *Civil Engineering*, Distinguished Service Professor—B.S., Michigan State University, 1939; M.S., University of Missouri, 1942; Reg. Prof. Engr.
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WURST, John C. (1971), *Mechanical Engineering*, Professor—B.M.E., University of Dayton, 1957; M.S.E., 1968; Ph.D., University of Illinois 1971; Reg. Prof. Engr.

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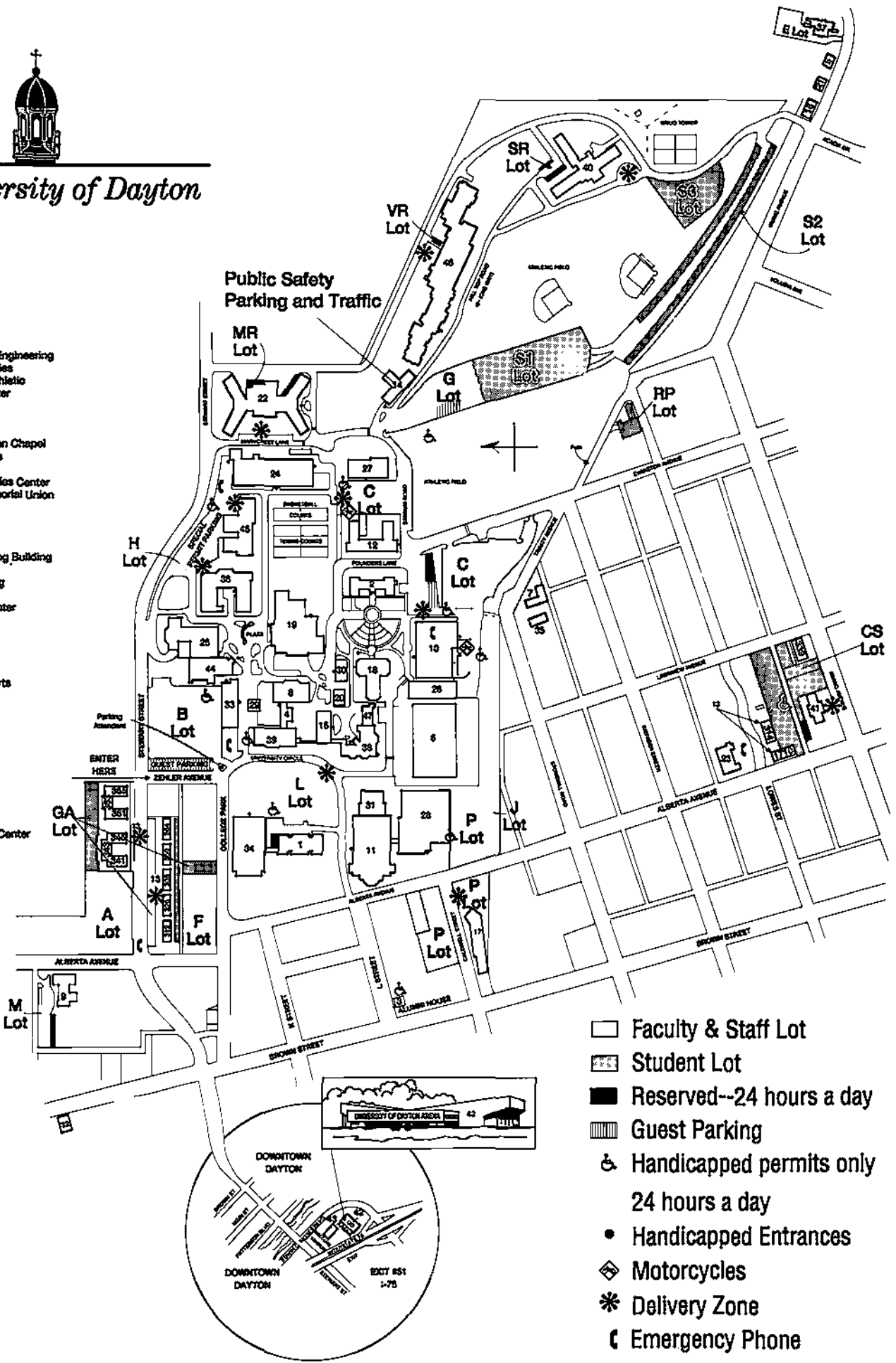
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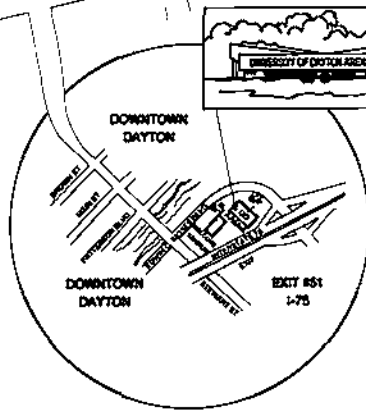


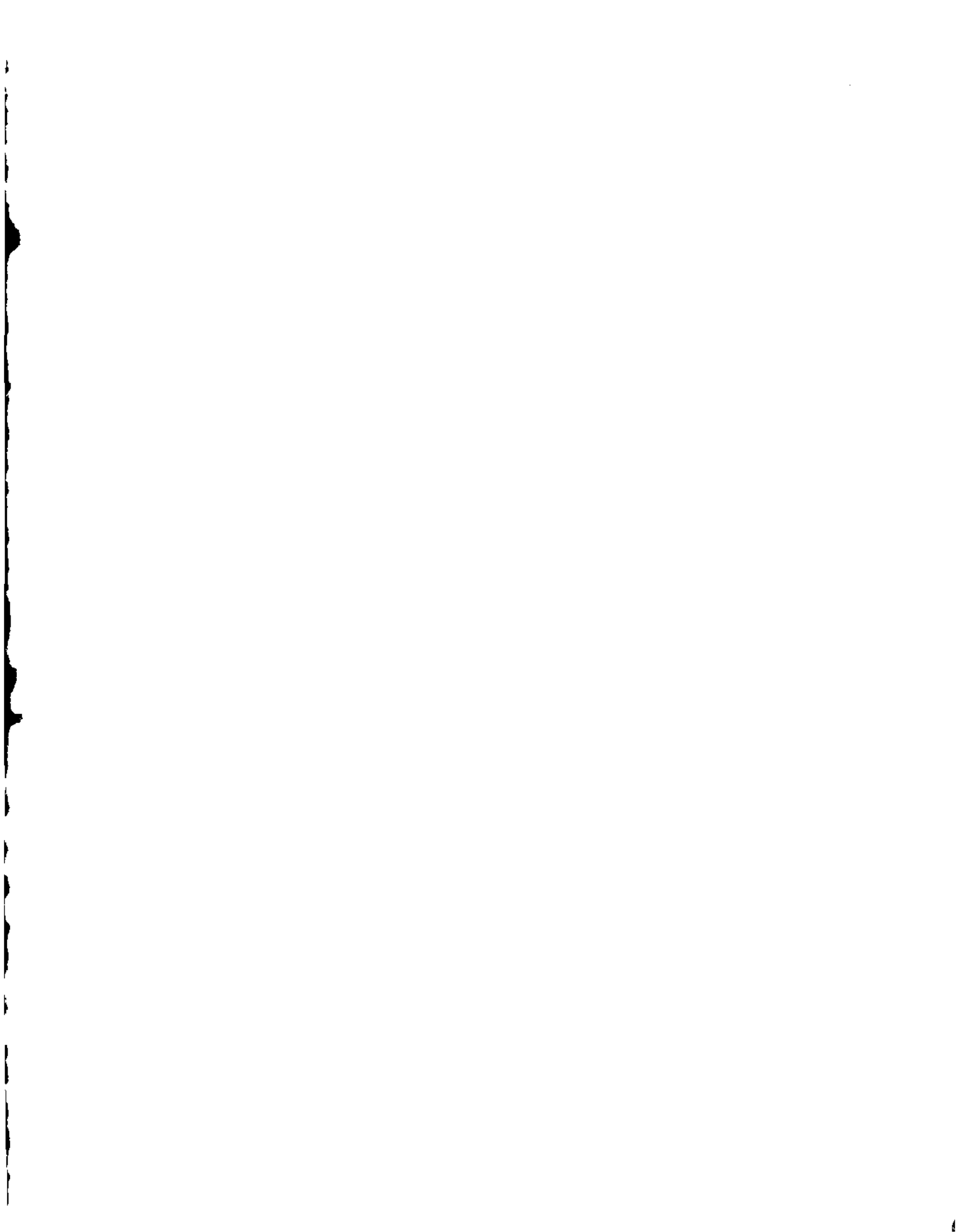
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