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THE UNIVERSITY OF DAYTON BULLETIN

Graduate Issue
January 1998

The University of Dayton

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The University of Dayton does not discriminate on the basis of age, race, national or ethnic origin, color, creed, or sex; nor against otherwise qualified disadvantaged students in its admissions and academic standards; nor in the granting of scholarships, loans, and other financial aid; nor in the planning and administering of its admission, academic, athletic, housing, and other policies; nor in any other programs, services and activities.

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.

The current number of any of these publications may be obtained by applying to the Office of Admission.

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1998 ACADEMIC CALENDAR

SECOND TERM

Fri., Jan. 2	Last day to complete registration
Mon., Jan. 5	Classes begin at 8 a.m.
Tue., Jan. 13	Last day for late registration, change of grading options and schedules
Mon., Jan. 19	Martin Luther King, Jr. Day—no classes
Fri., Jan. 23	Faculty Meeting: Budget decisions at 3:00 p.m.
Mon., Jan. 26	Last day to withdraw without record
Mon., Jan. 26	Fall Composite due
Fri., Jan. 30	Last day to change First Term grades
Fri., Feb. 6	Last day to submit candidacy for graduation in May
Tue., Mar. 3	Bro. Joseph Stander Symposium
Wed., Mar. 4	Bro. Joseph Stander Symposium
Sat., Mar. 14	Mid-term break begins after last class—Saturday classes meet
Sat., Mar. 21	Saturday classes meet
Mon., Mar. 23	Classes resume at 8:00 a.m.
Wed., Mar. 25	Last day to withdraw with record of W—no registration
Thu., Mar. 26	Summer registration begins
Fri., Apr. 3	General Faculty Meeting at 3:00 p.m.
Thu., Apr. 9	Easter recess begins after last class
Tue., Apr. 14	Classes resume at 8:00 a.m.
Tue., Apr. 21	Last class for Tuesday classes that meet once per week
Wed., Apr. 22	Last class for Wednesday classes that meet once per week
Wed., Apr. 22	Last class for all classes that meet on both Monday and Wednesday
Thu., Apr. 23	Last class for Thursday classes that meet once per week
Thu., Apr. 23	Last class for all classes that meet on both Tuesday and Thursday
Fri., Apr. 24	Last class for Monday classes that meet once per week
Fri., Apr. 24	Last class for all classes that meet on Monday, Wednesday, and Friday
Fri., Apr. 24	Last day of classes
Mon.-Fri., Apr. 27-May 1	Examinations — Second Term ends after final examinations
Sun., May 3	Commencement Exercises at 10:00 a.m.
Mon., May 4	Grades due in Registrar's Office at 9:00 a.m.
	Deficiency slips due in Deans' Offices
Fri., May 8	Grades ready
Fri., Jun. 5	Last day to change Second Term grades

THIRD TERM—FIRST SESSION

Fri., May 8	Last day to complete registration
Sat., May 9	Saturday classes begin
Mon., May 11	Classes begin at 8:00 a.m.
Tues., May 19	Last day for late registration, change of grading options and schedules
Wed., May 20	Last day to withdraw without record from first session courses
Mon., May 25	Memorial Day—no classes
Fri, Jun. 5	Last day to change Second Term grades
Mon., Jun. 8	Last day to withdraw with record of W from first session courses
Thu., Jun. 18	Last day of classes
Fri.-Sat., Jun 19-20	Examinations—Full Third Term classes do not meet
Sat., Jun 20	First session ends after final examinations

Tues., Jun. 23	Grades due in Registrar's Office at 9:00 a.m.
	Deficiency slips due in Deans' Offices
Fri., Jun. 26	Last day to submit candidacy for graduation in August
Fri., Jun. 26	Grades ready
Wed., Jul. 1	Last day to withdraw without record from full Third Term courses
Mon., Jul. 27	Last day to change first session grades

SECOND SESSION

Fri., Jun. 19	Last day to complete registration
Sat., Jun. 20	Saturday classes begin
Mon., Jun 22	Classes begin at 8:00 a.m.
Fri., Jun. 26	Last day for late registration, change of grading options and schedules
	Last day to submit candidacy for graduation in August
Wed., Jul. 1	Last day to withdraw without record from second session and full Third Term courses
Fri., Jul. 3	Independence Day observed—no classes
Mon., Jul. 20	Last day to withdraw with record of W from second session and full Third Term courses
Mon., Jul. 27	Last day to change first session grades
Thu., Jul. 30	Last day of classes
Fri.-Sat., Jul. 31-Aug. 1	Examinations—Second session ends after final examinations
Sun., Aug. 2	Diploma Exercises at 10:00 a.m.
Tues., Aug. 4	Grades due in Registrar's Office at 9:00 a.m.
	Deficiency slips due in Dean's Offices
Fri., Aug. 7	Grades ready

PROPOSED 1998-99 ACADEMIC CALENDAR

FIRST TERM

Sat.-Tue., Aug. 22-25	New Student Orientation
Wed., Aug. 26	Classes begin at 8:00 a.m.
Mon., Sept. 7	Labor Day — no classes
Tues., Sept. 8	Last day to change second session and full Third-term grades
Mon., Oct. 12	Columbus Day — no classes
Tues., Nov. 24	Thanksgiving recess begins after last class
Mon., Nov. 30	Classes resume at 8:00 a.m.
Thu., Dec. 8	Feast of Immaculate Conception — Christmas on Campus
Fri., Dec. 11	Last day of classes
Sat.-Fri., Dec. 12-18	Examinations
Sat., Dec. 19	Diploma Exercises

SECOND TERM

Mon., Jan. 4	Classes begin at 8:00 a.m.
Mon., Jan. 18	Martin Luther King, Jr. Day — no classes
Fri., Feb. 26	Spring Break begins after last class
Mon., Mar. 8	Classes resume at 8:00 a.m.
Wed., Mar. 31	Easter recess begins after last evening class
Tue., Apr. 6	Classes resume at 8:00 a.m.
Thu., Apr. 29	Last day of classes
Fri., Apr. 30	Study Day
Sat.-Fri., May 1-7	Examinations
Sun., May 9	Commencement

THIRD TERM
First Session

Mon., May 17	Classess begin at 8:00 a.m.
Mon., May 31	Memorial Day — no classes
Thu., Jun. 24	Last day of classes
Fri.-Sat., Jun. 25-26	Examinations

THIRD TERM
Second Session

Fri., Jun. 28	Classes begin at 8:00 a.m.
Mon., Jul. 5	Independence Day — no classes
Thu., Aug. 5	Last day of classes
Fri.-Sat., Aug. 6-7	Examinations
Sun., Aug. 8	Diploma Exercises

TABLE OF CONTENTS

Academic Calendar ..... I-II
Proposed Academic Calendar III
I. The University of Dayton 3
Brief History 3
Statement of Purpose 3
Administrative Structure 5
Academic Year 5
Accreditation 5
Institutional Memberships 5
Southwestern Ohio Council for Higher Education 6
Related University Services 6
Off-Campus Academic Centers 6
Campus Ministry 6
II. Financial Information 7
General Policy 7
Tuition and Fees 7
Cancellation and Refunds 7
Transcripts 8
Assistantships and Fellowships 8
III. Libraries and Research Services 9
Roesch Library 9
School of Law Library 9
Access to Other Resources 9
Computerized Online Literature Searching 9
Center for the Computer in Education 9
School of Education Curriculum Materials Center 9
Research Institute 9
IV. Student Life and Services 11
Residential Living 11
Food Services 11
Public Safety and Parking 11
Student Identification Cards 11
Kennedy Union 11
Recreational Sports 12
Health Services 12
Affirmative Action & Employee Development Office 12
Center for International Programs 13
The Counseling Center 13
Privacy Rights of Parents and Students 13
Student Handbook 13
Residential Programs Residence Coordinator 13
Student Activities Office 13
V. General Academic Information 15
Admission 15
Application 15
International Student Admission 16
Veterans 16
Undergraduate Students in Graduate Courses 16
Advising 16
Registration for Courses 17
Master's and Doctor's Degree Requirements 17
Residence Requirement 17
Transfer Credits 17
Advanced Undergraduate Courses 17
Elective Courses 17
Foreign Language Requirement 17
Comprehensive Examination 17
Thesis and Other Requirements 17
Serving on and Chairing of Master's Thesis and Doctoral Advisory Committees 17
Composition of Doctoral Advisory Committee 18
Sufficient Progress 18
Appeal for Change of Grade 18
Time Limit 18
Second Master's Degree 18
Academic Standards 18

VI. Interdisciplinary and Joint Studies **19**
Individual Interdisciplinary Programs 19
Other Interdisciplinary Programs 19
Juris Doctor/Master of Business Administration 19
School of Law 20
Communication, Interdisciplinary Program 20
Electro-Optics 20
International Marian Research Institute 20
Teacher Education, Interdisciplinary Program 20
VII. College of Arts and Sciences **21**
Biology, Department of 21
Chemistry, Department of 24
Communication, Department of 26
Computer Science, Department of 30
English, Department of 33
Mathematics, Department of 35
Philosophy, Department of 37
Physics, Department of 37
Political Science, Department of 38
International Affairs 38
Public Administration 39
Psychology, Department of 42
Clinical Psychology 44
Experimental-Human Factors Psychology 44
General Psychology 45
Religious Studies, Department of 48
Theological Studies 48
Pastoral Ministries 48
VIII. School of Business Administration **53**
The M.B.A. Program 53
Admission 53
Program of Studies 54
Program Concentrations 55
Individual Research 57
Transfer Credit 57
Academic Standards 58
The Business Advisory Council 59
Financial Assistance 59
Academic Awards 59
The JD/MBA Joint Degree 64
IX. School of Education **65**
Authorization 65
Assistantships 65
Admission 65
General Requirements 65
Special Requirements: School Psychologist 66
Special Requirements: Master of Science in Teaching 66
Master's Degree Programs 69
Counselor Education and Human Services, Department of 72
Educational Administration, Department of 75
Educational Leadership 78
Health and Sport Science, Department of 81
Teacher Education, Department of 83
X. School of Engineering **91**
Aerospace Engineering 95
Chemical Engineering, Department of 98
Civil and Environmental Engineering, Department of 99
Engineering Mechanics 101
Electrical Engineering, Department of 103
Electro-Optics 106
Engineering 109
Engineering Management 109
Management Science 111
Materials Engineering 113
Mechanical Engineering, Department of 116
XI. Directories **121**
Index 135

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 richness of cultural diversity, representatives of many faiths are numbered among the University faculty and students. For the same reason, the University has consciously drawn its students and faculty not only from the immediate community and the midwest but from across the country and from numerous foreign countries.

The main campus of over a hundred landscaped acres, is on a hill overlooking the city of Dayton, Ohio. The campus is made up of a well integrated architectural mix of old and new buildings that are both attractive and well-equipped. The faculty are excellent scholars who pursue knowledge in its rich variety and fine instructors dedicated to student learning and educational excellence. The University enrolls students from diverse social, ethnic, and economic backgrounds who are capable of and committed to learning, leadership, and service.

A lively, friendly atmosphere; 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 myriad aspects of the character of the University of Dayton.

MISSION

The University of Dayton is a comprehensive Catholic university, a diverse community committed, in the Marianist tradition, to educating the whole person and to linking learning and scholarship with leadership and service.

The University of Dayton offers a broad range of programs in liberal arts, the sciences, and the professions at the undergraduate level, to providing selected programs on the graduate level to meet the needs of the community and region, and to sponsoring timely continuing education programs. As comprehensive, the University views learning and scholarship as a shared task of discovering, integrating, applying and communicating knowledge at the intersections of liberal and professional education, across the disciplines, and through combining theory with practice.

As Catholic, the University commits itself to a distinctive vision of learning and scholarship that includes a common search for truth based on the belief that truth can be more fully known and is ultimately one; a respect for the dignity of each human person created in the image and likeness of God; and an appreciation that God is manifested sacramentally through creation and the ordinary things in life. Ultimately, a Catholic vision of the intellectual life is based upon the acceptance of the revelation of God in Jesus Christ as it has been received and handed on by the Church. This challenge calls for integration of the human and the divine, reason and faith, and promotes true understanding through a person's head and heart. The University welcomes persons of all faiths and persuasions to participate in open and reflective dialogue concerning truth and the ultimate meaning of life.

Founded in the Marianist tradition, the University is committed to a vision of a distinctive educational community. As Marianist, the University focuses on educating the whole person in and through a community that supports and challenges all who become a part of it. The University forms an educational community thriving on collaboration by people from diverse backgrounds with different skills who come together for common purposes. The University as Marianist challenges all its members to become servant-leaders who connect scholarship and learning with leadership and service.

This university community—comprehensive, Catholic and Marianist—exists not for itself, but to render service. The University creates an environment in which its members, working in a scholarly manner, are free to evaluate the strengths and weaknesses of their own work and the work of others. In partnership, through the Research Institute, Campus Ministry, as well as numerous student organizations, the University works with others to improve the human community.

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 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

[1]The 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.

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 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 was held; its classes were 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 turned its preparatory school functions over to Chaminade High School and graduated its last class in law for almost forty years, 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; all divisions opened to women, and the University of Dayton became co-educational.

Today, the University of Dayton is a comprehensive university consisting of the College of Arts and Sciences, the School of Business Administration, the School of Education, the School of Engineering, 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 only 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, 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 human institutions. 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; and 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, and the School of Law. The Deans, through their departments, administer the undergraduate and graduate programs. The Vice President for Graduate Studies & Research & Dean of the Graduate School has the overall responsibility for all graduate programs, and also administers all research activities connected with the University. At the head of the academic structure of the University is the 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, accounting, and Master of Business Administration programs of the School of Business Administration
- The American Bar Association for its School of Law
- The Association of American Law Schools for its School of Law
- The Human Factors Society for its master of arts program in experimental—human factors psychology
- 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
- The American Dietetic Association
- 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 Dietetics Association
- 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 and Universities
- The Association of American Law Schools
- The Association of Catholic Colleges and Universities
- The Association of Colleges and University 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 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.

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 International Services serves students from other countries who are enrolled at the University.

OFF-CAMPUS ACADEMIC CENTERS

The University of Dayton maintains off-campus centers, for graduate study in Business Administration (Columbus); Education (Lima and Columbus); Religious Studies (Fort Wayne, IN, and Findlay, OH). All programs and courses are closely supervised by the Deans of Education, Business, and Arts and Sciences as well as the Dean of the Graduate School. 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 more than thirty 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 courses taken for Undergraduate credit per credit hour $456.00
Tuition for Graduate semester credit hour —Arts & Science and Engineering 394.00
Tuition for Graduate semester credit hour — Business 409.00
Doctoral per semester credit hour (including Engineering) 444.00
MBA (off campus academic center) per semester credit hour 409.00
Religious course per semester credit hour (off and on campus) Fall & Winter 296.00
Religious course per semester credit hour summer 1998 only 170.00

SCHOOL OF EDUCATION

On campus per quarter hour 150.00
Off campus per quarter hour 150.00
Education Specialists program per quarter hour 195.00
Doctoral (on campus) per quarter hour 218.00
Doctoral per semester hour (Education majors only) 332.00
Secondary & Elementary Teachers & School Administrators (semester hours)—School Related Courses Only (Excluding Doctoral) ... 296.00

MISCELLANEOUS FEES

Application fee for all graduates . 30.00
EM Credit per credit hour 25.00
Late registration fee 25.00/week, to a maximum of 75.00
Lab fees per clock hour (maximum $250.00) 50.00
University Fee 25.00
Graduation Fee 75.00

EDUCATION BLOCK FEES

Elementary block fee per course . 50.00
Secondary block fee per course ... 50.00

AUDIT RATES

(1/2 REGULAR CREDIT HOUR RATE ROUNDED UP TO NEXT DOLLAR)

Audit (per quarter hour)
On Campus 75.00
(per quarter hour)
Off Campus
(per quarter hour) 75.00
(per semester hour)
Except Business 197.00
(Business — per semester hour) 205.00
(Graduate Religious Studies and secondary and elementary teachers and school administrators — per semester hour) 148.00
(Education Specialist Program — per quarter hour) 98.00
(Doctoral — on campus — per quarter hour 109.00
(Doctoral per semester hour) — Teachers & School Administrators 166.00
(Doctoral per semester hour) — Non-Education 222.00

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%

Special withdrawal rules apply if the student has been awarded Title IV Federal Financial Aid. Please contact Financial Aid office if you have any questions.

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 in Joseph E. Kellar Hall. 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, Residential Programs, Services for Diverse Student Populations, Public Safety, Food Services, and Recreational Sports.

RESIDENTIAL LIVING

The University of Dayton maintains a number of diverse housing units for graduate students. There are approximately 60 spaces for first-year law students in University housing; upperclass law and graduate students housing needs may also be accommodated on a space- available basis. Graduate and law school students interested in University housing should contact Residential Services at (937) 229-3317 upon their acceptance.

Student are advised to coordinate their housing arrangements as early as possible. If University housing is not available, information can be provided regarding private housing in the Dayton area.

FOOD SERVICES

University Food Services operates three full-service dining facilities: Kennedy Union and Marycrest Food Courts, food court ala carte service, VW Kettering Dining Hall which provides all-you-care-to-eat dining.

Graduate students may use all dining facilities on a cash basis; or for those who do not want to carry cash, Food Service offers a prepaid purchase plan for food, called Declining Balance. The Declining Balance account is accessed through the Student ID/ Campus One Card.

For further information regarding the Department of Food Services, please call 937-229-2441 or 1-800-259-8864.

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 communication without the fear of property loss or personal injury.

Campus parking facilities are limited. Graduate students and graduate assistants may purchase student parking permits. Commuting students may purchase permits to park in Lots S1 and S2.

Students living in UD houses or apartments may purchase 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

The University Student ID/Campus One Card provides official student identification; access to Declining Balance accounts, Flyer Express accounts, library; PAC, and computer lab privileges. Campus One Cards are issued by the Department of Food Services, 201 Powerhouse. Information about the Campus One Card and hours of operation may be obtained by calling 937-229-2441 or 1-800-259-8864.

KENNEDY UNION

Kennedy Union is the student union, a community center for the University. It is the 'living room' or the hearthstone of the college. Interaction between faculty and students occurs through the Forum on Global Concerns, Distinguished Speakers, Christmas on Campus, Campus Carnival, concerts, and plays.

Facilities include meeting rooms, a faculty dining room, Boll Theater, 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, 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 210A of the PAC, 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/LAW STUDENTS

A graduate student membership costs $71.00 individual basic and $200.00 for a family basic membership for a full year starting August 15th. A basic membership does not include usage of the Cardiovascular Aerobics Fitness Center. Fees for the basic-plus (Fitness Center included) are $300.00 individual and $500.00 for a family membership. Facilities available to graduate students include the Physical Activities Center and Cardiovascular Aerobics Fitness 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
- VI. Cardiovascular Aerobics Fitness Center
  - a. The newly renovated center features 28 state-of-the-art machines, suspended wood floor, T.V. monitors, sound systems, and carpet and air conditioning.

Fieldhouse
- I. Main Gymnasium
  - a. Four basketballl/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. During the academic year, the Health Center is open 24 hours a day. A physician is available for consultation every weekday morning and afternoon throughout the year, except University holidays. In case of emergency, call Public Safety, 2121.

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. 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.

All undergraduate students pay a student fee to cover the cost of services. Graduate and Law Students do not pay this fee. Beginning with the 1997-98 academic year, graduate students will be charged for services received at the Health Center. The charge for a physician visit is $35.00 to $70.00, depending on the length of visit and the type of services provided. Charges are also made for medicines dispensed, allergy injections, nurse visits, laboratory tests, x-ray examinations, and inpatient (bed) care in the Infirmary.

All charges incurred are reported to the Bursar to be entered on the student's account with the University. Inquiries regarding bills or university-sponsored insurance should be made at the Health Center during regular business hours of 8:30 a.m. to 4:00 p.m., Monday through Friday. Itemized statements can be provided upon patient request. These are not automatic and the Health Center does not bill outside insurance companies directly.

Full-time graduate students are eligible for university-sponsored health and accident insurance. For information about this program, visit the Health Center or call 3131.

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 development 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 Graduate or Law student chooses to make use of the Center and its facilities, then starting with the '97-'98 school year a fee of $75 for each individual session and $30 for each group session will be charged. This fee is payable at the time of services at the Center or can be charged to your Bursar account

Full-time students can be seen on a non-time-limited basis. Part-time Graduate and Law students are limited to 10 sessions.

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.

RESIDENTIAL PROGRAMS RESIDENCE COORDINATOR

Residential Programs is responsible for the development of a residential living experience that will support the educational mission of the University, as well as the academic goals of the individual student. The Office offers several graduate assistantships as Residence Coordinators in a variety of areas to help successfully accomplish this effort. You must be accepted into a graduate program at the University. Remuneration includes stipend, room and board, tuition remission, and a health insurance option. Send applications and resumes to:

Residential Programs
231 Gosiger Hall
University of Dayton
Dayton, Ohio 45469-0962

STUDENT ACTIVITIES OFFICE

The Office of Student Activities is responsible for providing support and direction to officially recognized student organizations and groups, as well as campus-wide programming opportunities for the student body. In conjunction with the Organizations Advisory Council, the office grants official recognition status to student organizations, allocates and monitors the use of university funds/space, provides leadership training and support to faculty and administrative advisors, and coordinates and implements a leadership program for all organization members and student leaders.

The campus Activities Board and Distinguished Speakers Series provide a variety of events for the University community including cultural/performing arts, special events, recreation, educational opportunities, and speakers. The Campus Activities Board works closely with the Office of Student Activities in planning, developing, implementing, and evaluating programming that is diverse and timely.

All social fraternities, sororities, and councils are responsible to the Office of Student Activities. Thus, the office sets standards, expectations, policies, and evaluations for all social Greek organizations.

The Director of Student Activities advises student media organizations including the Flyer Radio, DAYTONIAN yearbook, ORPHEUS literary magazine, and the FLYER NEWS while working in collaboration with faculty/staff technical advisors for each of the organizations.

In addition, the office staff is responsible for registering all "open" student organization sponsored events, programming the Flyer TV information channel, and coordinating and distributing a weekly/monthly calendar of events.

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. A copy of the application form is available in electronic form on the Graduate School web site.

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
GMAT .....required 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 $30.00 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 Services 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 $30 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 Admission test 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 International Student Application brochure.*

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.

Exceptions to this policy may be made with the approval of the Dean of the Graduate School.

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.

CRITERIA FOR SERVING ON AND CHAIRING OF MASTER'S THESIS AND DOCTORAL ADVISORY COMMITTEES

Composition of Master's Thesis Committee

Graduate faculty status is prerequisite to chairing a master's thesis committee. A master's thesis committee must consist of a minimum of three members, at least two of whom must be members of the graduate faculty.

Composition of Doctoral Advisory Committee

Graduate faculty status is prerequisite to chairing a doctoral advisory committee. Additional criteria for chairing dissertation committees may be prescribed by the School or College. A doctoral advisory committee must consist of a minimum of four members, at least three of whom must be members of the graduate faculty. One of the members must be an external member whose primary appointment is outside the candidate's program or department, or outside the University. The external member must be familiar with the standards of doctoral research and should be in a collateral field supportive of the student's dissertation topic. It is strongly recommended that this member have graduate faculty status, if from another graduate program.

The composition of the doctoral advisory committee is recommended by the chair of the relevant department/program, requires concurrence by the Dean (or designate) of the School or College, and approval by the Dean of the Graduate School.

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 the Graduate School

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

INDIVIDUAL INTERDISCIPLINARY PROGRAM

The University of Dayton, under the direction of the Vice President for Graduate Studies and Research and Dean of the Graduate School 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. James Dunne, Associate Dean and Director of MBA Program, School of 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.

SCHOOL OF LAW

Information concerning the University of Dayton School of Law and its academic program is contained in the School of Law Bulletin which is available directly from the School of Law, Office of Admission and Financial Aid, 300 College Park, Dayton, Ohio 45469-1320, Phone (937) 229-3555.

COMMUNICATION (CAI) INTERDISCIPLINARY PROGRAM

Kathleen Watters, 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 Roman Pontifical Theological Faculty Marianum. Housed in the Marian Library, IMRI offers annual graduate-level summer schools on a three-year cycle to promote the programs of Marian Studies established by the Marianium. World-renowned theologians often join the faculty as guest instructors or lecturers.

Through IMRI, students can work toward a Pontifical Licentiate of Sacred Theology (S.T.L.) or Doctorate of Sacred Theology (S.T.D.)—each with specialization in Mariology—a certificate in Marian Studies, or a master's degree in religious studies with specialization in Mariology from the University's Department of Religious Studies, offered in a joint program. Course offerings include studies in Mariology, Christology, ecclesiology, spirituality, and theological anthropology.

Recognized as one of the world's leading centers for Mariological studies, the International Marian Research Institute also is committed to scholarly Marian research and the promotion of Marian art.

Admission is approved by the director of IMRI and an advisory council.

TEACHER EDUCATION (EDT) INTERDISCIPLINARY PROGRAM

Daniel Raisch, Chair
Gordon E. Fuchs, 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
Mary Jo Vesper, Associate Dean

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
Ecosystem Dynamics

Basic Biomedical Sciences
Advanced Developmental Biology
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. Each student is required to complete BIO 552-553, BIO 501, BIO 601 and two advanced courses by the end of the first year. During the third term of the first year all students (M.S. or Ph.D.) who have not taken a Biostatistics course as an undergraduate must enroll in Bio 550 (Biometrics). 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 examination 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. The Ph.D. program is a full-time only program. If the advisory committee encourages attendance of a semester or a summer as a full-time student at a neighboring institution or in an off-campus research site, 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.
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 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. A maximum of two undergraduate courses at the 400 level may be applied toward graduate credit.

BIO 501. SEMINAR: Presentation of biological research data by faculty 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. ECOSYSTEM DYNAMICS: An advanced course examining ecosystem structure and function. Emphasis on community level interactions, applied ecology and the ways in which ecosystem biodiversity can be influenced by the biotic and abiotic forces of the environment, including the global impact of the human species. Prerequisite: Upper-level course in ecology. *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 adaptive 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. hrs.*

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

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. hrs.*

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: This course is required of all graduate students, and is designed to acquaint students with advanced laboratory techniques used in biological research. Topics include theory and applications of protein and nucleic acid techniques, data analysis, and preparation of scientific manuscripts, posters and grant proposals. *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 570. ADVANCED DEVELOPMENTAL BIOLOGY: An advanced course on the principles of animal development with emphasis on concepts and experimental evidence for underlying mechanisms. This course is designed to present the latest and newest advances in development, and includes discussion on the use of current model systems. Prerequisite: Introductory course in developmental biology, cell biology or permission of instructor. *3 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. hrs.*

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 GLASSBLOWING: 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)

Donald D. Yoder,
Chair of the Department
Kathleen B. Watters, 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 contributions of scholars in rhetoric, communication theory, and mass communication. A solid grounding in research, theory, message development and analysis will prepare graduates to begin or advance their careers in education, business, mass media, government, and business.

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 master's program. Students 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.
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). *All correspondence concerning the admission should be directed to the Office for Graduate Applications and Records.*
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 15 credit hours are completed.

PROGRAM OPTIONS AND REQUIREMENTS

General Requirements
All students enrolled in the program are subject to the following general requirements.

1. The number of semester hours as specified by the program options described below.
2. All students must complete the core courses: COM 501 and COM 536. Program B students must also complete COM 503.
3. Demonstration of satisfactory progress toward the degree which includes the requirement that students maintain a minimum average of B (3.0) in course work. Students who fail to meet this requirement are dismissed from the program.
4. 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.
5. It is the student's responsibility to know and to meet the requirements of the University and of the Department of Communication graduate program.

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

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 an oral examination. (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.) Students may 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.

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. All students choosing Program C 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 an oral 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 exams 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.

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. *0 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. *0 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 intructor. 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. 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 media through which organizational 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. PROPAGANDA ANALYSIS: 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
James P. Buckley,
Raghava G. Gowda,
Yi Pan
Graduate Program Directors

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 3.0. 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 2-semester 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.

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 and taken the GRE. 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.

The Computer Science Department has two laboratories in Anderson Center that house the departmental servers and workstations. In addition, the department has a third laboratory with microcomputers and a fourth laboratory for digital design, microcomputer inferfacing, and networking.

The Office for Computing Activities provides general educational computing facilities to all university students. These facilities include a DEC Alpha computer and a variety of 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; 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. Prerequisite: CPS 350. *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, Statistics. *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, 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 350. *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. *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 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. 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)

Alex Cameron,
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, composition, 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 or 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 LITERARY 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-FICTION*: 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
MATHEMATICS (MTH)

Thomas E. Gantner,
Chair of the Department
Paul W. Eloe
Graduate Program Director

The Department of Mathematics offers a Master of Science in applied mathematics. This program is interdisciplinary in nature. A plan of study may include up to a four course concentration in computer science, engineering, or business for students with appropriate backgrounds. The primary objective of the program in applied mathematics is to train students to do professional work in the applications of mathematics. The program provides a background in mathematical, numerical, and statistical analyses and students will gain valuable experience in modeling and computation. Students will have the opportunity to work on a semester or year-long project, the Mathematics Clinic project.

The program strives to offer an individualized plan of study that meets the needs and career goals of the student. This is achieved by offering a core of courses blending analysis, linear algebra, modeling, and numerical analysis in the Department of Mathematics. The student, with departmental approval, will select a four-course concentration. The Mathematics Clinic project, the capstone requirement, is a research project in which the student applies mathematical, numerical, or statistical modeling methods to a problem related to the student's four-course concentration. The Mathematics Clinic project can be a team project and can involve faculty members from several departments.

ASSISTANTSHIPS

Financial assistance is available to qualified students through graduate teaching assistantships. A graduate assistant receives a stipend, tuition remission, and health benefits. Most graduate assistants require two years to complete the requirements for a master's degree.

ADMISSION REQUIREMENTS

Applicants should have a bachelor's degree in a technical area such as mathematics, engineering, computer science, physics, or economics 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. Prerequisites include post-calculus courses in ordinary differential equations and linear algebra, introductory statistics and programming skills.

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.

COMPUTING FACILITIES

Departmental PCs, the MATHSCI Computer Learning Environment, and the University of Dayton's mainframe computer are available for student use in conjunction with projects or coursework.

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, Lp-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 quantitive 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. NUMERICAL ANALYSIS I: Solutions of nonlinear equations, Newton's methods, fixed point methods, solutions of linear equations, LU decomposition, iterative improvement, QR decomposition, SV decomposition. Prerequisites: CPS 132 or 150 or equivalent, MTH 302 or equivalent. *3 sem. hrs.*

MTH 556. NUMERICAL ANALYSIS II: Interpolating functions, numerical differentiation, numerical integration including Gaussian quadrature, numerical solutions of differential equations. Prerequisites: CPS 132 or 150 or equivalent, MTH 219 or equivalent. *3 sem. hrs.*

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, paracompactness 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

**There is no graduate program in philosophy at this time. The courses listed below support other graduate programs.*

COURSES OF INSTRUCTION

PHL 621 AMERICAN PRAGMATISM
PHL 653 AESTHETICS

PHL 654. PHILOSOPHY OF RELIGION

PHL 655 SOCIAL AND POLITICAL PHILOSOPHY

PHL 690 SEMINAR

PHL 690 is regularly taught to the School of Law. PHL 653 is still sometimes taught for the School of Education.

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.*

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 Electro-Optics. For more details on the program requirements, see Electro-Optics (EOP) in the 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 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.*

PHY 599/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.*

Department of
POLITICAL SCIENCE (POL)

David W. Ahern,
Chair of the Department
Peter B. Nelson,
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

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

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 at 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 36 hours of course work with a cumulative grade point average of 3.0 or better.
   A. The 36 hours of course work must include POL 503 (Colloquium in Comparative Politics), POL 502 (International Relations), POL 590 (Research Seminar), and POL 504 (Politics of International Economic Relations).
   B. The remainder of the 36 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 504	Politics of International Economic Relations
POL 509	Russian Foreign Policy
POL 502	International Relations
POL 506	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 527	Russian Politics
POL 523	Latin American Politics
POL 525	Politics in the Middle East
POL 528	Communism and Post Communism
POL 529	West European Politics
POL 530	Chinese Politics
POL 531	Japanese Politics
POL 583	Comparative Public Policy
POL 457	Political Change in the Third World
POL 544	Politics of Human Rights

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. The internship is required of pre-career students.
   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 555	Selected Topics in Public Policy

The Nonprofit Sector

MPA 561	Introduction to Nonprofit Organizations

Public Law/Bureaucracy

MPA 571	Administrative Law

Topical Seminars/Independent Work

MPA 591	Seminar in Public Administration
MPA 593	Independent Study in Public Administration
MPA 595	Government Internship

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 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 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 591. SEMINAR IN PUBLIC ADMINISTRATION: Seminar on selected problems in public administration. Students are expected (as individuals or team members) to produce research manuscript suitable for professional dissemination. 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. Prior approval of formal project proposal required. *3-6 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. *1-6 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. Prior approval of formal project proposal required. *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 (a) further graduate studies at the Ph.D. level, and/or (b) work at the M.A. level in an applied/community setting, in teaching, or in 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 com-

petitive 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 to be considered 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 1. Applications received after this deadline will be reviewed depending upon the availability of openings in specific programs. 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 psychotherapy,
(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
Psychology Core Requirements		12
PSY 501	Experimental Design & Statistics I	3
PSY 502	Experimental Design & Statistics II	3
PSY 510	History & Systems	3
PSY 599	Thesis	3
Clinical Core Requirements		28
PSY 550	Introduction to Clinical Psychology	3
PSY 551	Assessment of Intelligence	3
PSY 553	Theories & Research in Psychopathology	3
PSY 555	Theories of Personality & Psychotherapy	3
PSY 556	Assessment of Personality	3
PSY 564	Individual Psychotherapy	3
PSY 565	Ethical & Cultural Issues in Clinical Assessment & Psychotherapy	3
PSY 569	Practicum (1 credit each)	4
PSY 573	Developmental Psychology	3
Child Emphasis Requirements		6
PSY 560	Childhood Psychopathology & Psychotherapy	3
PSY 566	Marriage & Family Therapy*	3
Adult Emphasis Requirements		3
PSY 558	Group Psychotherapy*	3
PSY 566	Marriage & Family Therapy*	3
Total Semester Hours		46

**With approval of the Director of the Clinical Program, an elective may be substituted for either Psy 558 or 566.*

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
Core Requirements		12
PSY 510	History & Systems	3
PSY 501	Experimental Design & Statistics I	3
PSY 502	Experimental Design & Statistics II	3
PSY 599	Thesis	3
Experimental-Human Factors Core Requirements		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 539 Practicum in Human Factors 3
Electives 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
(May be taken more than once for credit)
PSY 534 Human Computer Interaction. 3
PSY 522 Advanced Cognitive 3
PSY 528 Psychophysiology 3
PSY 532 Special Topics in Human Factors 3
(May be taken more than once for credit)
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: Cognitive, Developmental, and Social Processes

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 takes a minimum of two courses 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.

Core Requirements 12
PSY 501 Experimental Design and Statistics I 3
PSY 502 Experimental Design and Statistics II 3
PSY 510 History & Systems 3
PSY 599 Thesis 3
General Psychology Requirements .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.

Developmental Psychology Courses 6
PSY 573 Developmental Psychology
PSY 574 Cognitive Development in Children
PSY 457 Television and its Effects on Children

Cognitive Psychology Courses 6
PSY 522 Advanced Cognitive Processes
PSY 529 Perception
PSY 524 Human Information Processing

Social Psychology Courses 6
PSY 585 Experimental Social Psychology
PSY 537 Team and Group Processes
PSY 444 Environmental Psychology

Electives 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. HISTORY & SYSTEMS: 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 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. Group decision making and leadership are also emphasized. 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, etiol-

ogy, and treatment alternatives. Emphasis is on the process of expanding knowledge through research. Practice in the use of current diagnostic classifications. Graduate status in Clinical Program 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 in Clinical Program 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, PSY 551, 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 553, 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. ETHICAL & CULTURAL ISSUES 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 status 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 status 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, social influence, attribution, aggression, helping and intrinsic motivation. Prerequisite: Graduate status. *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 status 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)

Terrence W. Tilley, 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. 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 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. *2-3 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. *2-3 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. *2-3 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. *2-3 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. *2-3 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. *2-3 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. *2-3 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. *2-3 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. *2-3 sem. hrs.*

REL 522. AUGUSTINE TO OCCAM: Analysis of the life and thought of individual leaders of the Church. *2-3 sem. hrs.*

REL 523. TRENT TO VATICAN II: Historical account of Christianity's theological reponse to the major reformers and of further theological developments of Christianity in the context of philosophy, science, and political revolutions up to Vatican II. *2-3 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. *2-3 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. *2-3 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. *2-3 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. *2-3 sem. hrs.*

REL 537. CHRISTOLOGY: An examination of the approaches taken by contemporary theologians in discussing Jesus and his significance for Christian faith. *2-3 sem. hrs.*

REL 540. ECCLESIOLOGY: Study of the nature and mission of the church, with an emphasis on Catholic perspectives. Topics include the church as mystery, models of the church, ecumenism, authority, laity, and the church-world relationship. *2-3 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. *2-3 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. *2-3 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. *2-3 sem. hrs.*

REL 546. LITURGY: Study of the theological perspective on the history and the future of Christian liturgy. *2-3 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. *2-3 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. *2-3 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. *2-3 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. *2-3 sem. hrs.*

REL 562. CONTEMPORARY MORAL PROBLEMS: An open approach to contemporary moral issues within theological perspectives. *2-3 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. *2-3 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. *2-3 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. *2-3 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. *2-3 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. *2-3 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. *2-3 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.
2-3 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. *2-3 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 emphasis on authors such as Piaget, Kohlberg, Erikson, Fowler, and Rokeach. May be repeated for graduate credit when topic changes.
2-3 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.
1-3 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 theologian, 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
James Dunne,
Associate Dean and MBA Director
Jeffrey Carter, Asst. Director,
MBA Program

THE SCHOOL OF BUSINESS ADMINISTRATION AND MBA PROGRAM MISSION

The School of Business Administration is a learning community that prepares students to enter or further business careers, and attain advanced professional graduate education. The School is committed, in the Marianist tradition, to educating the whole person and to connecting learning, scholarship, leadership, and service within a contemporary business curriculum. The faculty and administrators of the school believe that globalization, developing technologies, and workforce diversity have created a demand for change in higher education. Thus, we have created programs that are integrative of business knowledge and skills, multicultural and collaborative, global in perspective, technologically sophisticated, and cost effective.

The mission of the Master of Business Administration (MBA) Program is, through a set of coordinated educational experiences, to develop in our graduates business knowledge and business skills for addressing the important issues faced by modern organizations and for developing and implementing effective plans of action. The level and breadth of the knowledge and skills acquired by our graduates should make them prime candidates for significant *leadership* within their organizations.

The program places significant emphasis at the *critical thinking* level of learning and will strive to develop students who are builders of *knowledge structures* that can be used to interpret new situations, think, reason, and solve problems. The program focuses not only on business *knowledge* but also on *skills* and *attitudes* which have been shown to be useful and important for organizational success.

The MBA Program strives to produce graduates with the following characteristics:

A "big picture" person
Knows business functions and processes
An outstanding communicator
Appreciates technology
Has a global perspective
Committed to quality
A problem solver/decision maker
A team player
Respects all individuals
Is honest and has high integrity
Ready to "take the lead"

PROGRAM LOCATIONS

The full MBA Program is offered in two locations: *Dayton.* The program on the University of Dayton campus serves the Dayton business community and has a mix of full-time and part-time working professional students. *Columbus.* The same program, delivered by the same faculty, is also available in Columbus, Ohio on the campus of Ohio Dominican College. This program serves the Columbus business community with a high-quality professional graduate education program that is flexibly designed for the working professional.

ACCREDITATION

The University of Dayton's business programs, MBA and undergraduate, are fully accredited by the most rigorous accrediting body for business education programs, AACSB—The International Association for Management Education. Only about 300 of the 700 or more MBA programs in the country have this accreditation that assures students of high-quality faculty and programs.

THE ACCOUNTING "150 HOUR" PROGRAM

Most states, including Ohio, have modified the accountancy law such that an individual must complete a 150-hour program to be eligible to sit for the Certified Public Accountant (CPA) examination. The new requirement becomes effective in Ohio in the year 2000. The University of Dayton accounting program will afford students the opportunity to fulfill the 150 hour CPA requirement for Ohio and similar states by earning a B.S. degree with an accounting major followed by earning the M.B.A. degree. Such students will take the MBA core courses plus appropriate accounting or other electives. Students will complete the MBA program requirements in consultation with their faculty advisors and the chair of the Department of Accounting.

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 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 approximately two weeks before classes begin, provided that all admission materials have been received. The Registrars 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 to take the GMAT is the responsibility of each student. A GMAT pamphlet that provides guidance is available in the MBA Office.

Admission to the program is granted to students showing high promise for success in graduate business study. Indicators of high promise for success 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. Please send a resume.

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 30 semester credit hour program for the student with a recent undergraduate background in business. For the student with a non-business background, or who lacks course work in key areas of undergraduate business study, foundation courses are required.

Eighteen core semester hours (six courses) are prescribed for all students. Additional breadth or depth in a selected subject area may be achieved by taking 12 hours of elective courses for the required program total of 30 semester hours.

A. PROGRAM OF STUDIES

There are four groups of courses in the Program:

GROUP I	Foundation Segment
GROUP II	Integrated Core Segment
GROUP III	Capstone Segment
GROUP IV	Elective Courses

Before taking core and elective courses, students are expected to have acquired basic knowledge in the business areas listed as foundation courses.

Thirty semester hours of core, capstone, and elective courses are required for the MBA degree. Where foundation courses are required, the total number of hours required will be greater.

Program Prerequisites: Prior to beginning the MBA Program, each student is expected to have current proficiency in business math (to include integral and differential calculus), with business spreadsheet software, and with business communication skills. Business math is offered as an undergraduate evening course by both the UD and Ohio Dominican College Mathematics Departments. Business software skills may be developed via self-paced tutorials. Short seminars in business communication skills are offered through the School's Management Development Center. For international students for whom English is a second language, the University's English Language and Multicultural Institute (ELMI) offers courses for improving business communication skills.

GROUP I. **Foundation Segment:** Any student needing course work in basic business knowledge and skills is required to take the appropriate course(s) from the following foundation courses. The Foundation Segment consists of up to a maximum of 22 hours. All foundation courses (except MBA 620) are accelerated, half-semester courses.

MBA 600	Financial Accounting
MBA 601	Managerial Accounting
MBA 610	Business Data Analysis
MBA 611	Statistical Techniques for Decision Analysis
MBA 612	Manufacturing & Service Systems
MBA 620	Financial Analysis & Markets
MBA 630	Marketing Principles
MBA 640	Microeconomics
MBA 641	Macroeconomics
MBA 650	Organizations & Their Environment
MBA 660	Information Technology & Systems
MBA 670	Organizational Transformation & Strategic Leadership
MBA 671	Leading and Managing Organizational Competencies

A student applying to the MBA Program may have foundation course work waived if appropriate undergraduate studies with earned grades of C or better have been completed within a reasonable time frame. A foundation course may also be waived based on a placement exam in the area. All placement exams should be taken prior to the second term of enrollment. Placement exams are administered at no cost to the student. They are scheduled at the student's convenience by calling the MBA Office in Dayton at (937) 229-3733 and in Columbus at (614) 251-4740.

Alternatively, foundation requirements may be fulfilled via additional undergraduate work prior to matriculation into the MBA Program. Grades earned from such course work will not be calculated into the cumulative MBA grade point average. For information on appropriate undergraduate courses to waive foundation requirements, contact the MBA Office.

Whenever foundation courses are required, they must, when offered, be completed before proceeding to core or elective courses. However, if minimum prerequisites are met, a student may take core or elective courses during the term in which the last foundation is being completed, or if the required foundation(s) are not available.

GROUP II. **Integrated Core Segment:** The Integrated Core portion of the program consists of 12 semester hours (4 courses). The following four courses are required:

MBA 691	Analytic Framework for Business Decision Making
MBA 692	High-Quality Operational Systems
MBA 693	Managing Information and People in Organizations
MBA 694	Managing Financial Resources for Marketing Strategies

GROUP III. **Capstone Segment:** The Capstone Segment of the program consists of 6 semester hours (2 courses) completed over two semesters. The following courses are required.

MBA 698	Leadership, Strategy, and Stakeholder Management
MBA 699	Capstone Integrative Project

GROUP IV. **Elective Courses:** Twelve hours of elective courses are required. They may be selected to obtain program breadth or depth in a particular area. The student may choose from among the MBA courses offered, or with approval by the MBA Director students may elect up to six semester hours of graduate courses from other programs at the University when these are appropriate to their education plans.

TIME LIMITATION

All course work, exclusive of foundations, must be completed within five calendar years of enrollment in the first core or elective course applicable to the degree.

B. PROGRAM CONCENTRATIONS

Students may choose their electives so as to acquire a program concentration. Specific concentrations are offered in Finance, International Business, Management Information Systems, Operations Management and Marketing (proposed). Selection of an area of concentration is the option of the student; however, the MBA Office must be advised of the selection to provide for its administration. The area of concentration is noted on the student's transcript. A minimum of 9.0 semester hours of concentration-based elective credit is required for each concentration selected.

Finance (FIN) Concentration

This concentration provides the student with selected program depth and development of applicable skills in Finance. A more comprehensive understanding of investments and financial markets, international finance, and the management of financial institutions may be achieved. Upon fulfillment of MBA 620, a student may complete 9.0 semester hours of the following electives to achieve a concentration in FIN:

MBA 625	Investments and Financial Markets
MBA 626	International Financial Management
MBA 627	Management of Financial Institutions
MBA 629	Special Topics in Managerial Finance

International Business (INT) Concentration

The International Business concentration is designed to develop an understanding of both the opportunities of global markets and also the challenges of the multicultural aspects of global business operations. Upon completion of the respective prerequisites, selection may be made from the following electives to achieve a concentration in INT:

MBA 626	International Financial Management
MBA 636	Seminar in International Market Analysis
MBA 646	International Trade and Applications
MBA 676	Understanding Multicultural Differences
MBA 686	International Business Policy

A student option may be to focus on a specific country or region with additional approved course work or internship credit. There are also opportunities to earn elective credit for this concentration via various existing graduate study abroad programs such as in Dublin, Ireland; Mikkeli, Finland; and other overseas sites. Interested students need to contact the MBA Office for information about such programs.

Management Information Systems (MIS) Concentration

This concentration provides the student with an in-depth understanding of information technology — computers, telecommunications, artificial intelligence, office automation; and the knowledge and skills needed to become a productive end user and/or an effective information resource manager. Upon completion of the respective prerequisites, selection may then be made from the following electives to achieve a concentration in MIS:

MBA 608	Accounting Information Systems

MBA 661 Business Expert Systems
MBA 662 Business Telecommunications
MBA 663 Management of Information Resources
MBA 664 Database Management
MBA 665 Systems Analysis and Design
MBA 667 MIS Design Project
MBA 668 MIS Research Seminar
MBA 669 Special Topics in Management Information Systems

Operations Management (OPM) Concentration

The OPM concentration develops a firm foundation in the current and evolving principles and techniques employed in managing the operations of a manufacturing or service organization such as total quality management and theory of constraints. The concentration provides a business perspective on concepts such as JIT, CAD/CAM, CIM, business process reengineering, and others. Upon completion of the respective prerequisites, selections may be made from the following electives to achieve a concentration in OPM:

MBA 607 Accounting Planning and Control Systems
MBA 613 JIT and Quality in Manufacturing and Services
MBA 614 Analysis of Factory Systems
MBA 618 Operations Management Research Seminar
MBA 619 Special Topics in Operations Management
MBA 661 Business Expert Systems
MBA 672 Seminar in Personnel and Industrial Relations

Graduate courses from the School of Engineering:

ENM 505 Management of Engineering Systems I
ENM 510 Technological Forecasting
ENM 515 Human Factors Engineering
ENM 522 Operations Research II
ENM 523 Optimization I
ENM 530 Cost and Economic Analysis for Engineers
ENM 555 System Dynamics I
ENM 560 Quality Assurance
ENM 561 Design and Analysis of Experiments
ENM 565 Reliability Engineering
ENM 572 System Simulation
ENM 575 Introduction to Artificial Intelligence
MEE 580 Product and Process Automation
MEE 581 Computer-Aided Engineering
MEE 582 AutoComputer-Aided Engineering Design
MEE 583 Automated Manufacturing
MEE 584 Integrated Manufacturing Systems
MEE 585 Design for Producibility
MSC 521 Operations Research I
MSC 527 Optimization III
MSC 542 Inventory Theory and Application
MSC 546 Queuing Theory and Application

In this particular area, either MBA 613 or MBA 614 must be taken as one of the three electives.

Marketing (MKT) Concentration

This concentration will provide the non-marketing professional with current marketing knowledge and skills in order to be an effective user of market research information and an effective participant in marketing planning of a product or service. The concentration can also provide the marketing professional with an update of state-of-the-art marketing insights and techniques. Upon completion of prerequisites, selections may be made from the following elective courses:

MBA 635 Research for Marketing Decisions
MBA 636 Seminar in International Market Analysis
MBA 638 Product Planning and Development
MBA 639 Special Topics in Marketing
The following topics are offered as separate courses:
Consumer Behavior
Marketing of Services
Promotional Management
Advertising

C. POSSIBLE SCHEDULES OF STUDY

The University of Dayton's MBA curriculum has the *flexibility* often needed by business professionals: students may begin any term and may proceed at any pace from 1 course per term to 3 or 4 courses per term. A few curriculum requirements must be satisfied: (1) Foundation courses (or waiver from them) first, (2) Integrated Core courses in any order but prior to the Capstone courses, and (3) the second capstone (MBA 699) after the first (MBA 698). Each year, full schedules of courses are offered in the fall and winter semesters. In addition, a partial schedule of courses is offered each summer in two convenient, compressed summer sessions.

As illustrations, three possible schedules for completing the MBA program of study are identified here. Many others are feasible and each student should develop his or her own plan.

PROGRAM OF STUDY 1:
TWO PER TERM
— 2 Courses per term pace
— Foundations already completed
— Remaining degree requirements of 30 hrs.
— A concentration may be earned if desired

FIRST TERM:*
MBA 691 Analytic Framework for Business Decisions
MBA 692 High Quality Operational Systems
SECOND TERM:
MBA 693 Managing Information and People in Organizations
Elective
THIRD TERM:
MBA 694 Managing Financial Resources for Marketing Strategies
Elective
FOURTH TERM:
MBA 698 Leadership, Strategy, and Stakeholder Management
Elective
FIFTH TERM:
MBA 699 Capstone Integrative Project
Elective

*If a summer term, must adjust because more than one integrated core course may not be possible.

PROGRAM OF STUDY 2:
THREE PER TERM
— 2 or 3 courses per term pace
— Foundations already completed
— Remaining degree requirements of 30 hrs.
— A concentration may be earned if desired

FIRST TERM:*
MBA 691 Analytic Framework for Business Decisions
MBA 692 High Quality Operational Systems
Elective
SECOND TERM:*
MBA 693 Managing Information and People in Organizations
MBA 694 Managing Financial Resources for Marketing Strategies
Elective
THIRD TERM:
MBA 698 Leadership, Strategy, and Stakeholder Management
Elective
FOURTH TERM:
MBA 699 Capstone Integrative Project
Elective

*If a summer term, must adjust because more than one integrated core course may not be possible.

PROGRAM OF STUDY 3:
ACCELERATED-ONE YEAR
— 4 Courses per term pace
— Foundations already completed
— Remaining degree requirements of 30 hrs.
— Earning a concentration is difficult — may be impossible
— Start in Fall Term

FIRST TERM (fall):
MBA 691 Analytic Framework for Business Decisions
MBA 692 High Quality Operational Systems
MBA 694 Managing Financial Resources for Marketing Strategies
Elective
SECOND TERM (winter)
MBA 693 Managing Information and People in Organizations
MBA 698* Leadership, Strategy, and Stakeholder Management
Elective
Elective
THIRD TERM (summer)
MBA 699 Capstone Integrative Project
Elective

*MBA 698 is allowed if three of the integrated core courses are complete and the final one is being taken concurrently.

D. INDIVIDUAL RESEARCH

Students who have an interest in doing an in-depth study of a particular business topic can elect individual research. Individual research can qualify for one to six semester hours of credit; most studies are three semester hours. A student may take MBA 695 when 12 core hours (after foundations) have been completed.

Approval is obtained by completing a project proposal form available from the MBA Office. A student works with a faculty member to agree on a topic and a project proposal. The faculty advisor and the MBA Director review and approve the proposal prior to registration. The student is expected to maintain close contact with the faculty member who will provide guidance and evaluation. Individual Research projects are to be completed within the course of one term.

E. TRANSFER CREDIT

A maximum of six semester hours of appropriate graduate courses earned at another accredited graduate school may be applied toward the post-foundation requirements of the MBA Program at the University of Dayton. This transfer credit may be applied if one graduates from the UD MBA Program within a maximum of seven years from the date such courses were completed.

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 course work 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 descriptions 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 course work must be of "B" quality or better. Quality points are not transferred.

F. TRANSFER DUE TO JOB RELOCATION

The University of Dayton is a member of a selected group of accredited Catholic Schools of Business who have jointly agreed to a special transfer arrangement. A student may transfer up to half of the post-foundation course work to another MBA Program at one of these universities. These programs

are located in many major cities such as Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, Milwaukee, New Orleans, Portland, St. Louis, San Diego, San Francisco, Santa Clara, Scranton, and Spokane. Please contact the MBA Office for up-to-date information about the specific universities and the guidelines of this special transfer agreement.

G. ACADEMIC STANDARDS

The faculty of the University of Dayton School of Business Administration is committed to a rigorous learning environment which challenges MBA students to achieve high levels of performance. This environment fosters the development of mature business skills and abilities in students.

The design and orientation of courses differ depending, among other factors, on the level of the course. Foundation courses provide a curricular knowledge; 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. For these courses, the faculty pursues various avenues of pedagogy that advance students' understanding of 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 engage students as active participants in the learning process. This may take the form of student teams, case analyses, simulations, projects, or other methods of learning.

The faculty maintains high expectations of itself and students. In creating and maintaining a climate of challenge, the faculty requires students to demonstrate significant academic achievement. The faculty communicates these expectations to students early in each semester by setting high, realistic objectives as presented in the syllabus and possibly in other written documents, which are reinforced in the classroom. The faculty then carefully evaluates student performance in light of these objectives, and uses the full range of grades to evaluate student performance. The efforts to establish and maintain a climate of rigor vis-a-vis grading standards is fully supported by the School of Business Administration.

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—Excellent (4 quality points)
B—Average (3 quality points)
C—Poor (2 quality points)
F—Failure (0 quality points)

If an "F" grade is received in a foundation, integrated core, or capstone course, the student must repeat the course and achieve a passing grade. Both the original grade and the new grade are computed in the cumulative grade point average.

WITHDRAWAL "W" GRADE

During the Fall and Winter terms a student may withdraw from a full-semester course without record during approximately the first three weeks of the term. During the accelerated Summer Sessions, withdrawal without record may take place during approximately the first two weeks. Thereafter, a student in a full-semester course 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. For half-semester courses, contact the MBA Office.

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. This grade is appropriate if conditions beyond the control of the student have led to an inability to complete all the course requirements. 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.

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

The "N" grade indicates that 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 requirements and is eligible to graduate within the 5-year limit. Failing this, the student will be dismissed.

GRADE APPEALS

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 may 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.

Assistantships are limited each year; therefore, competition is keen. Applicants should submit their application forms at any time prior to April 1. Selections are made during the summer months for the period beginning August 16. Some positions may begin in January or May.

A student while on academic probation will not be eligible for initiation or continuation of financial assistance administered by the School of Business Administration.

Application forms for graduate assistantships are obtained from the MBA Office or from the Office of Graduate Studies, Room 200, St. Mary's Hall.

DEAN'S FELLOWSHIPS

Each term a limited number of Dean's Fellowships are available. To apply, the student submits an application and a statement to the MBA Director 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.

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 Raymond A. Roesch, S.M., Award of Excellence for outstanding academic achievement is awarded each May to the MBA graduate from the preceding year who, based on the judgment of the faculty, has demonstrated the highest level of academic achievement and contributions in his or her MBA program. The award consists of a plaque which is presented to the student plus an engraved plate displayed in the MBA Office.

COURSES OF INSTRUCTION

Integrated Core Segment

MBA 691. ANALYTIC FRAMEWORK FOR BUSINESS DECISION MAKING: An examination of the role of analytic thinking and analytic models and techniques in providing support and insight for business decision making. Types of business decisions studied include product price, production level, production mix, distribution system design, operational process design, and others. Spreadsheets facilitate such analytic techniques as mathematical optimization, regression analysis, linear and integer programming models, and simulation models. Minimum prerequisites: MBA 610, 611, and 640. *3 sem. hrs.*

MBA 692. HIGH-QUALITY OPERATIONAL SYSTEMS: Manufacturing and service operations are examined utilizing a process orientation and treating business as an integrated system. Topics include total quality management, cost of quality, activity-based management, theory of constraints, target costing, business process reengineering, ethical responsibilities of managers, and measures for evaluating operational performance. Learning approach involves considerable student interaction, participation in student teams, and interdisciplinary integration of concepts from management accounting, operations management, and other fields. Focus is on practical applications. Minimum prerequisites: MBA 601 and 612. *3 sem. hrs.*

MBA 693. MANAGING INFORMATION AND PEOPLE IN ORGANIZATIONS: This course addresses two key resources in business organizations: information technology and

people. It draws from the fields of management information systems, organizational behavior, and organization theory. Students focus on understanding how managing information, organization design, information technology, and human resources in an integrative manner can enhance the productivity of knowledge workers and work groups/teams, as well as the effectiveness of contemporary organizations. Minimum prerequisites: MBA 660, 670, and 671. *3 sem. hrs.*

MBA 694. MANAGING FINANCIAL RESOURCES FOR MARKETING STRATEGIES: This course gives students the opportunity to study the techniques, processes, tools, and methods necessary to assess strategic marketing and financial opportunities and to balance these in the long-run best interest of the firm. Minimum prerequisites: MBA 600, 620, and 630. *3 sem. hrs.*

Capstone Segment

MBA 698. LEADERSHIP, STRATEGY, AND STAKEHOLDER MANAGEMENT: One of a two-course set of capstone integrative experiences which explores the process of creating, sustaining, and growing successful businesses in an era of change. The course deals with strategic decision making and stakeholder management related to competitive, economic, political, social, cultural, and technological environments in small, medium, and large companies in service and manufacturing settings. Prerequisites: MBA 691, 692, 693, and 694 (exceptions under special circumstances may be granted). *3 sem. hrs.*

MBA 699. CAPSTONE INTEGRATIVE PROJECT: Another of the two-course set of capstone integrative experiences which explores the process of creating, sustaining, and growing successful businesses in an era of change. During the capstone project experience, students work in teams to analyze the strategic environment of a firm and develop a series of recommended actions. Students gain experience in working in a team environment in a non-academic setting, and experience the pressure of delivering a high-quality product to company leaders. The approach taken is tailored to the specific needs of the business as well as the talents of the particular student team. Note: Occasionally, this capstone course may be satisfied with one of several other approved project courses. See the MBA Office for these options. Prerequisite: MBA 698 (under special circumstances may be taken concurrently with MBA 698). *3 sem. hrs.*

Foundation Segment

MBA 600. FINANCIAL ACCOUNTING: An introduction to the concepts and procedures underlying financial accounting and to the use of financial accounting information for decision making. *2 sem. hrs.*

MBA 601. MANAGERIAL ACCOUNTING: An introduction to the concepts underlying the preparation and use of accounting data by managers as they plan, control and make decisions within the organization. Topics covered include just-in-time (JIT) systems, activity based costing (ABC), flexible manufacturing environment, theory of constraints, and cost of quality. Prerequisite: MBA 600. *2 sem. hrs.*

MBA 610. BUSINESS DATA ANALYSIS: An introduction to the statistical techniques of collecting, classifying and analyzing data, the fundamentals of probability theory, probability distributions, the central limit theorem and estimation. Prerequisite: Business Math. *1.5 sem. hrs.*

MBA 611. STATISTICAL TECHNIQUES FOR DECISION ANALYSIS: An introduction to methods that are central in generating information for decision analysis. Topics include hypothesis testing, regression analysis, and experimental design. Prerequisite: MBA 610. *1.5 sem. hrs.*

MBA 612. MANUFACTURING AND SERVICE SYSTEMS: An introduction to both traditional and modern manufacturing and service systems, including operating philosophies that drive these systems and the important tools and techniques used therein. Prerequisites: MBA 610 and 611. *1.5 sem. hrs.*

MBA 620. FINANCIAL ANALYSIS AND MARKETS: An overview of finance to include the analysis of financial statements, valuation concepts, capital budgeting techniques, capital structure analysis, working capital management, and capital market financing instruments. Prerequisite: MBA 600. *3 sem. hrs.*

MBA 630. MARKETING ESSENTIALS: This course covers the essentials of marketing, including macro and micro concepts that affect marketing management. The course will introduce marketing terminology, definitions, theories, concepts, and practices. The course will center around the decision variables used by marketing managers, both at the domestic and global level. *1.5 sem. hrs.*

MBA 640. MICROECONOMICS: Basic microeconomic principles and their applications. Consumer behavior, production theory, and the interaction of buyers and sellers in various kinds of markets. *1.5 sem. hrs.*

MBA 641. MACROECONOMICS: Basic macroeconomic principles and their applications. National income, monetary policy, fiscal policy, and the economic role of the government in the United States. Prerequisite: Recommend MBA 640. *1.5 sem. hrs.*

MBA 650. ORGANIZATIONS AND THEIR ENVIRONMENTS: 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. *1.5 sem. hrs.*

MBA 660. INFORMATION TECHNOLOGY AND SYSTEMS: An introduction to the basic technology underlying information systems and to the concepts and techniques needed in

analyzing, designing, and managing those systems. Prerequisite: Business software skills. *1.5 sem hrs.*

MBA 670. ORGANIZATIONAL TRANSFORMATION AND STRATEGIC LEADERSHIP: This course introduces students to management topics conceptualized at the organization and subunit levels of analysis. The primary focus is on how organizations generate capacities for change in response to their environments. Particular emphasis is placed on organization design as a means of adaptation. *1.5 sem. hrs.*

MBA 671. LEADING AND MANAGING ORGANIZATIONAL COMPETENCIES: This course introduces students to management topics conceptualized at the individual and group levels of analysis. The primary focus is on how organizations enhance their capacity for internal change in response to evolving technologies and tasks. Particular emphasis is placed on developing individual and group competencies. *1.5 sem. hrs.*

Electives

Accounting

MBA 604. TAX FACTORS IN BUSINESS DECISIONS: An examination of the provision 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 the interaction of income, estate, and gift taxes. Prerequisites: MBA 600 and 601. *3 sem. hrs.*

MBA 605. 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 692. *3 sem. hrs.*

MBA 607. ACCOUNTING PLANNING & 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 692. *3 sem. hrs.*

MBA 608. 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 660 and 692. *3 sem. hrs.*

MBA 609. SPECIAL TOPICS IN ACCOUNTING: Advanced and current topics in accounting. Topics vary. Prerequisites: Vary, depending on topic. *3 sem. hrs.*

Operations Management

MBA 613. JIT AND QUALITY IN MANUFACTURING AND SERVICES: 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 692. *3 sem. hrs.*

MBA 614. ANALYSIS OF FACTORY SYSTEMS: Study of the concepts and techniques of analysis, design, and management of factory production systems. Work-flow layout, scheduling techniques, stochastics process models, simulations and computerized factory models. Prerequisites: MBA 610, 611, 612 and Business Math. *3 sem. hrs.*

MBA 618. OPERATIONS 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 OPM elective. *3 sem. hrs.*

MBA 619. SPECIAL TOPICS IN OPERATIONS MANAGEMENT: Advanced or special topics in the analysis, design, operation, and maintenance of manufacturing and service systems. Topics vary. Prerequisites: Vary, depending on topic. *3 sem. hrs.*

Finance

MBA 625. 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 620. *3 sem. hrs.*

MBA 626. 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 620. *3 sem. hrs.*

MBA 627. MANAGEMENT OF FINANCIAL INSTITUTIONS: Study of management issues relating to depositories, insurance companies, and securities firms. As preparation for studying these institutions we review the financial system, the Federal Reserve, financial instruments, and interest rates. The course will include case studies related to the institutions and a bank simulation game. Prerequisite: MBA 620. *3 sem. hrs.*

MBA 629. SPECIAL TOPICS IN FINANCE: In-depth application of

financial principles to selected areas. Topics vary. Emphasis may be on working capital management, capital budgeting, applied portfolio management, mergers and acquisitions, corporate restructuring, or selected topics. Prerequisites: Vary, depending on topic. *3 sem. hrs.*

Marketing

MBA 635. RESEARCH FOR MARKETING DECISIONS: Integrative overview of the functional areas of research design, data collection, data analysis, and interpretation of findings within the context of decision-making for marketing. Prerequisites: MBA 611 and 694. *3 sem. hrs.*

MBA 636. SEMINAR IN INTERNATIONAL MARKET ANALYSIS: Integration of concepts, theories, and analytical procedures associated with market analysis of international markets. This course provides a managerial and strategic perspective on international marketing. It is designed to assist students in developing appropriate business skills and making marketing management decisions in the international context. Prerequisite: MBA 630. *3 sem. hrs.*

MBA 638. PRODUCT PLANNING AND DEVELOPMENT: Integrates various product management processes and concepts as customer-focused problem solving. Using projects or simulations, provides an opportunity to practice skills in developing and introducing a new product in a competitive environment. Emphasis on how various techniques can be interpreted to answer questions about performance, not on the mathematical properties of the tools. Prerequisite: MBA 630. *3 sem. hrs.*

MBA 639. SPECIAL TOPICS IN MARKETING: Advanced and current topics in marketing. Topics such as product management, consumer behavior, services marketing, sales, and advertising. Prerequisites: Vary, depending on topic. *3 sem. hrs.*

Economics

MBA 646. INTERNATIONAL TRADE AND APPLICATIONS: The main objective of this course is to present a comprehensive, up-to-date, and clear exposition of the theory and applications of international economics that are essential for understanding, evaluating, and suggesting solutions to the important contemporary international economic problems and issues facing the business firms in the U.S. and abroad. Prerequisites: MBA 640 and 641. *3 sem. hrs.*

MBA 649. SPECIAL TOPICS IN ECONOMICS: Advanced and current topics in economics. Topics vary. Prerequisites: MBA 691 and other, depending on topic. *3 sem. hrs.*

Business Environment and Ethics

MBA 651. 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. Prerequisites: MBA 670 and 671. *3 sem. hrs.*

MBA 652. 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. Prerequisites: MBA 670 and 671. *3 sem. hrs.*

MBA 653. CONTEMPORARY BUSINESS ISSUES: 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 includes presentations by a team of corporate executives. Prerequisites: Completion of all foundation courses. *3 sem. hrs.*

MBA 654. HUMANITIES INSTITUTE: This is a weekend course designed for in-depth discussions of ethics, values, and justice based on the study of art, literature, philosophy, and history. Throughout the course, issues are assessed from the perspective of the business professional. An additional fee to cover course supplies. Prerequisites: Completion of all foundation courses plus one term of integrated core work. *3 sem. hrs.*

MBA 659. SPECIAL TOPICS – ORGANIZATIONS AND THEIR ENVIRONMENTS: Advanced and current topics in organizations and their environments. Topics vary. Prerequisites: Vary, depending on topic. *3 sem. hrs.*

Information Systems

MBA 661. BUSINESS EXPERT SYSTEMS: Study of expert systems and other types of intelligent systems, and their applications in business. Knowledge acquisition, knowledge representation, inference and control strategies, heuristic search, uncertainty, machine learning, and system development. LEVEL 5 OBJECT software tool for expert system development project. Prerequisite: MBA 660. *3 sem. hrs.*

MBA 662. BUSINESS TELECOMMUNICATIONS: Study of computer-based business communication systems. Media characteristics, signal representation and transmission, wide and local area networks, communication protocols, message routing, network design, and network management. Assignments include a term paper requiring an in-depth study of a selected topic. Prerequisites: MBA 610 and 660. *3 sem. hrs.*

MBA 663. MANAGEMENT OF INFORMATION RESOURCES: The focus of this course is on the strategic and management issues associated with the effective organizational use of information technology. Role of the chief information officer; strategic planning — impacts and alliances; information technology assimilation; information technology architectures, functional organization, and operational control; information systems project management. Cases and readings. Prerequisites: MBA 660, and 693 recommended but not required. *3 sem. hrs.*

MBA 664. DATABASE MANAGEMENT: Introduction to databases and their management. File organization and data structures; database management systems; major data models; conceptual, logical, and physical database design; data definition and manipulation with SQL; data administration; and client/server and distributed databases. SQL-based software tool for database project. Prerequisite: MBA 660. *3 sem. hrs.*

MBA 665. SYSTEMS ANALYSIS & DESIGN: Study of the concepts, techniques, and tools of the information system development life cycle and other development methodologies. Requirements determination, structured analysis and object-oriented analysis and design techniques, systems development (CASE) tools, prototyping, human factors, and system implementation. Prerequisite: MBA 660. *3 sem. hrs.*

MBA 667. MIS DESIGN PROJECT: Student team experience with an information system development project for an actual organization. Project definition and planning, system analysis, design specifications, and implementation. Several team technical reports and presentations. A capstone experience for the MIS concentration. Prerequisite: MBA 665 or equivalent. *3 sem. hrs.*

MBA 668. 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: Varies, depending on topic. *3 sem. hrs.*

MBA 669. SPECIAL TOPICS IN MANAGEMENT INFORMATION SYSTEMS: Advanced and current topics in management information systems. Topics Vary. Prerequisites: Vary, depending on topic. *3 sem. hrs.*

Management and Human Resources

MBA 672. 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. Prerequisites: MBA 670 and 671. *3 sem. hrs.*

MBA 673. 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. Prerequisites: MBA 670 and 671. *3 sem. hrs.*

MBA 674. INTERPERSONAL DYNAMICS IN ORGANIZATIONS: The nature, types, formation characteristics of groups that interact with 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. Prerequisites: MBA 670 and 671. *3 sem. hrs.*

MBA 676. UNDERSTANDING MULTICULTURAL DIFFERENCES: This course has as its main objective to help students understand and learn about the many cultures that they will encounter in their work experience. The primary emphasis is on understanding how and why cultures differ and the important function they play in organizational settings. Prerequisites: MBA 670 and 671. *3 sem. hrs.*

MBA 679. 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. Prerequisites: Vary, depending on topic. *3 sem. hrs.*

Business Strategy

MBA 680. ENTREPRENEURSHIP AND THE FAMILY FIRM: This course covers a variety of topics of interest to the student of entrepreneurship. It is concerned with all phases in the life span of the owner-managed enterprise. It begins with opportunity recognition and ends with succession to a next generation of management through any of a variety of means. Major topic areas include startup issues, business planning, financing, marketing, managing the growing firm and succession. Several guest speakers will provide insights from their experience as entrepreneurs, and panels made up of experts who serve entrepreneurial clients are often utilized. Each class period uses multiple learning methodologies. Some field work and writing are required. Prerequisites: All Foundation courses. *3 sem. hrs.*

MBA 681. 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. Prerequisites: Completion of all 4 Integrated Core courses is strongly recommended. *3 sem. hrs.*

MBA 682. 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. Prerequisites: Completion of all 4 Integrated Core courses is strongly recommended. *3 sem. hrs.*

MBA 686. INTERNATIONAL BUSINESS POLICY: The course is designed to illustrate several issues about international business. The issues include theories of international business, the analysis of business

strategy in terms of a specific industry on a global level, and how to successfully implement business strategy on the international scale. A student project is required. Prerequisites: Completion of all 4 Integrated Core courses is strongly recommended. *3 sem. hrs.*

MBA 689. SEMINAR IN STRATEGIC PLANNING: Study of the Strategic Management processes in theory and practice using text, current literature, cases, company studies, and a project. Class meetings will be primarily group discussion with some lectures by the instructor and reports by students. Prerequisites: Completion of all 4 Integrated Core courses is strongly recommended. *3 sem. hrs.*

MBA 695. INDIVIDUAL RESEARCH: Individual research in subjects encompassed by the MBA curriculum under the guidance and direction of a faculty member. Research may be undertaken on completion of 12 hours of post-foundation course work. A formal proposal must be completed and approved by the faculty advisor and the MBA Director prior to registration. *1-6 sem. hrs.*

MBA 695-C. INDIVIDUAL RESEARCH — CAPSTONE: Individual research which includes, at least partially, study of the overall organization or the interaction of several functions of an organization. May under special circumstances be used as a substitute for MBA 699. Prerequisites: Completion of all 4 Integrated core courses and MBA 698 is strongly recommended. A formal proposal must be completed and approved by the faculty advisor and the MBA Director prior to registration. *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. MBA students may begin business course work during any semester. For students who have not yet entered the MBA Program, however, the first year of the joint degree program is normally taken entirely in the Law School and covers the same prescribed courses for all Law students. Course work in the second and third years is normally 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 MBA foundation courses. In such cases, the student can expect to complete requirements for both degrees within four to five 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 each program, respective degrees are conferred.

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 to four calendar years through such acceleration.

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. Applications 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 admission applications. The first year of work is normally in the Law School if MBA course work has not already been started, so it is advisable to contact the Dean of the Law School early.

School of Law (937) 229-3211;
School of Business Administration (937) 229-3733

PROGRAM PLANNING

Upon admission to the joint degree program, the student will be assigned an advisor from both the Law School and the School of Business Administration. Each student is required to meet with the respective program advisors to plan his/her program. Continuous liaison must be maintained throughout the joint degree program.

IX SCHOOL OF EDUCATION

Patricia F. First, Dean
James R. Biddle, 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 teachers 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.
7. To prepare leaders in the field of physical education.

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 Associate Dean for Academic Affairs.

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 a baccalaureate 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 may register one time only and accumulate no more than 8 quarter hours prior to formal acceptance. Students are not permitted to register for a second term without having been formally admitted. Hours earned in excess of 8 may 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.

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.

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)

William R. Drury,
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, guidance supervisors for state, county, and local systems, and counselors for community and other agency settings to reflect the Human Service Practitioner as a facilitator of Individual and Community Growth.
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 within the Learning Communities. These two missions are conducted at the University of Dayton campus, Lima, Columbus, and other sites as approved.

The Department offers four emphases at the graduate level:

School Counseling
College Student Personnel Services Counseling
Community Counseling
School Psychology

In addition, selected courses in behavioral and social science and other related disciplines lead to provisional certification as a school counselor or 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, each program requires additional specialized requirements as detailed in the handbook. Students are accepted into programs at specific times during the year. See special requirements in footnotes to individual programs.

SCHOOL COUNSELING

General Requirements

50 quarter hours
Report, Field Experiences course
Culminating Seminar/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 580 Guidance in the Elementary School 3

2. **Social and Cultural Foundations** (Required)
EDC 673 Counseling Multiethnic Populations 3

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

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

10. **Practicum** (Required)
EDC 545 Practicum: Counseling Techniques. 5
Includes substantial hours in school/agency setting

11. **Culminating Experience**
EDC 600 Culminating Seminar/Exit Examination 2
To be taken in last term

12. **Field Experience** (Required)
EDC 599 Field Experience in School Counseling 4
Includes substantial hours in school/agency setting.

Some Electives
Courses *Quarter Hours*
EDC 574 Independent Studies .. 1-3
EDC 602 Counseling Seminars 1-4
EDC 635 Marriage & Family Counseling 4
EDT 504 Human Development and Education. 4
EDC 578 Consultation in the Schools. 4
EDC 581 Techniques of Child Counseling. 3

Note: To become a Certified School Counselor, a student must:

1. Be a certified teacher.
2. Have two years of successful teaching experience.
3. Have completed a minimum of 45 graduate quarter hours in Counseling courses which cover the eleven 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: School counselors wishing to pursue the status of Professional Counselor should see an advisor.

TEACHER AS CHILD/YOUTH DEVELOPMENT SPECIALIST

This program is currently under review. New students are not being accepted at this time.

SCHOOL SOCIAL WORKER

This program is currently under review. New students are not being accepted at this time.

COLLEGE STUDENT PERSONNEL SERVICES COUNSELING

Program curriculum and requirements are currently under revision and subject to change.

General Requirements

60 quarter hours
Reports, Internships, EDC 553
Exit Examination in EDC 600
Program for Full-Time Students and for Staff members of College Student Personnel Services in Dayton.

Recommended Sequence of Courses

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 and Other Exceptionalities 4

2. **Social and Cultural Foundations** (Required)
EDC 673 Counseling Multiethnic Populations 3

3. **Philosophy, Professional Ethics, Law** (Required)
EDC 544 Philosophical, Professional, Ethical, Legal Aspects of Counseling .. 3

4. **General Administration, Objectives, Services, Trends** (Two Courses Required)

EDC 554 Introduction to College Student Personnel Services 3
EDC 555 Administration and Organization of CSP Programs 3

5. **History of American Colleges/ Universities** (Required)
EDT 512 History of Higher Education in the US 4

6. **Appraisal of Individual** (Required)
EDC 533 Psychometrics 3

7. **Lifestyles and Career Development** (Required)
EDC 529 Psychology of Lifestyles 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
*Prerequisite: EDC 543

10. **Research, Statistics, Proposal Writing, Evaluation** (One Course Required)
EDA 513 Evaluation of Educational and Organizational Systems 4
EDT 503 Educational Research Methodology 4

11. **Practicum** (Required)
EDC 545 Practicum: Counseling Techniques . 5
Prerequisite: All required Counseling courses. Includes substantial hours in school/agency/college counseling setting.

12. **Culminating Seminar/Exit Examination**
EDC 600 Culminating Seminar/Exit Examination 2
To be taken in last term

13. **Internships in College Student Personnel Services** (Three Internships Required)
EDC 553 Internships in College Student Personnel Services 9
Note: Often first internship is taken during student's second term at UD. (Three internships, 3 quarter hours each, one internship per term)

Internships must be taken during the office hours of the services, usually mornings and early afternoons. Summer internships begin in May and finish at the end of June. This is not a summer program. Courses given only on Main Campus: EDC 554, EDC 555, EDC 553, EDT 512. All internships must be approved by the director of the program.

Electives: EDC 602
Seminars

COMMUNITY COUNSELING

General Requirements

72 quarter hours
600 clock hour internship
Scholarly Project
Comprehensive Exam

Courses Required

1. **Human Development** (Two Courses Required)
EDC 531 Personality & Human Development Across the Lifespan 3
*EDC 623 Foundations in Abnormal Psychology (Prerequisite: EDC 531) 4

2. **Social & Cultural Foundations** (Two Courses Required)
EDC 673 Counseling Multiethnic Populations.. 3
*EDC 635 Marriage and Family Counseling 4

3. **Foundations of Professional Responsibilities, Ethical, and Legal** (Required)
EDC 544 Philosophical, Professional, Ethical, and Legal Aspects in Counseling ... 3

4. **Appraisal of the Individual** (Two Courses Required)
EDC 535 Test Interpretation and Case Studies 3
*EDC 631 Diagnosis of Emotional and Mental Disorders 4
*Prerequisite: EDC 623

5. **Lifestyle and Career Development** (Required)
EDC 529 Psychology of Lifestyles and Career Decision Making 3

6. **Counseling Theory and Techniques** (Two Courses Required)
EDC 543 Counseling Theory and Techniques 4
EDC 545 Practicum: Counseling Techniques (Prerequisite: EDC 543) 5

7. **Group Dynamics** (Required)
EDC 583 Theories and Techniques of Group Counseling 4
Prerequisite: EDC 543

8. **Research & Evaluation** (One Course Required)
EDA 513 Evaluation of Educational and Organization Systems 4
EDT 503 Educational Research Methodology 4

9. **Supervised Practica** (Required)
EDC 584 Practicum: Group Counseling 4
Prerequisites: EDC 545 & EDC 583

10. **Internship** (12 quarter hours required)
EDC 598 Field Experience I (Internship) 4
Prerequisite: EDC 584
EDC 598 Field Experience II (Internship) 4
Prerequisite: EDC 584
EDC 598 Field Experience III (Internship) 4
Prerequisite: EDC 584

Scholarly Project (One Required) (Title and Course Number are in Process)
EDC Thesis
(Scholarship with Inquiry)
Prerequisite: EDT 503 or EDA 513
OR

EDC Project of Excellence (Scholarship with Counseling Competence)
Prerequisite: EDT 503 or EDA 513
OR
EDC Transformative Project (Scholarship with Social Action Application)
Prerequisite: EDT 503 or EDA 513

Culminating Seminar/Exit Examination (Required)
EDC 600 Culminating Seminar 2
Prerequisite: EDC 584

Professional Seminars 6

*Clinical counseling courses

Notes: In order to fulfill the education requirements for the status of Professional Counselor (PC), in addition to completing the master's degree students must also complete in community counseling the 18 quarter hour post master's program in clinical counseling (as follows).

Content Areas and Coursework

General Requirements

18 quarter hours

1. **Evaluation of Mental and Emotional Status** (Required)
   EDC 630 Evaluation of Mental and Emotional Condition 4
2. **Methods of Intervention and prevention of Mental and Emotional Disorders** (Required)
   EDC 681 Integrative Approach to Clinical Counseling 4
3. **Treatment of Mental and Emotional Disorders** (Two Courses Required)
   EDC 683 Treatment of Mental and Emotional Disorders 4
   EDC Counselor Supervision (Title and Course Number in Process) 4

Professional Seminars 2

Total: 18 Quarter hours
Licensure Total: 90 quarter hours

Clinical Counseling Program Notes: For the license of PC, the Board of Counseling and Social Work requires 30 quarter hours in five content areas. Eighteen quarter hours meeting three content areas are completed in the post-master's clinical counseling program outlined above. Twelve quarter hours are completed in the required coursework for Community Counseling: EDC 623 Foundations in Abnormal Psychology, (content area: Clinical Psychopathology, Personality, and Abnormal Behavior); EDC 635 Marriage and Family Counseling, (content area: Methods of Intervention and Prevention of Mental and Emotional Disorders); EDC 631 Diagnosis of Emotional and Mental Disorders (content area: Diagnosis of Mental and Emotional Disorders).

Note: Students who are pursuing the 90 quarter hour education requirements and have completed a 60 hour master's degree in Counseling before July 1, 1997, a 30-hour program in Clinical Counseling will be available. Please see an advisor.

Counseling Licensure

According to the Ohio Counseling and Social Worker law revised in December, 1996, students desiring the license of Professional Counselor must successfully complete a master's degree in Counseling and achieve a total of 90 quarter hours in the specified content areas. In addition, the student must achieve a passing grade on the competency test administered by the Board of Counseling and Social Work. Counselors who have obtained the PC license and who have received two additional years (3000 hours) of approved supervised clinical experience will be awarded the Professional Clinical Counselor (PCC) license.

MASTER'S DEGREE AND OHIO CERTIFICATION IN SCHOOL PSYCHOLOGY

(Applicants should send for "School Psychology Program Description" booklet.)

I. Psychological Foundations (24 quarter hours)

A. **Cultural Diversity and Human Exceptionality** (Two Courses Required)
   EDT 590 Educating Diverse Student Population in an Inclusive Setting 4
   AND
   EDC 673 Counseling Multiethnic Populations 3
   OR
   EDT 646 Multicultural Education 3

B. **Human Learning** (Required)
   EDT 501 Learning Theory 4

C. **Normal & Abnormal Child and Adolescent Development** (Two Courses Required)
   EDT 504 Human Development 4
   EDC 536 Psychology of Personality Development 3

D. **Biological Bases of Behavior** (Required)
   EDC 571 Foundations of Neuropsychology 3

E. **Social and Emotional Bases of Behavior** (Required)
   +EDC 537 Diagnosis & Treatment Planning 3

II. Educational Foundations (8 -17 hours)

F. Philosophy **(Required)**
   EDT 502 Philosophical Studies in Education 4

G. **Curriculum and Instructional Techniques** (Required)
   ++EDA 511 Curriculum 4

H. **Education of Exceptional Learners** (Required)
   EDT 593 Educating Students with SLD 4

I. **Organization and Operation of Schools** (Required)
++EDC 539 Administration of Pupil Personnel Services 3

J. **Field Based Experiences** (Required)
++EDC 573 Orientation to the Educational Process 2

III. **Assessment and Intervention** (46-49 quarter hours)

K. **Diagnosis & Remed. of Basic Academic Areas** (Two Courses Required)
EDT 581 Assessment of the Learner with Special Needs 4
OR
EDC 535 Test Interpretation & Case Study 3
OR
EDC 533 Psychometrics ... 3
AND
EDT 594 Diagnostic Teaching in SLD 4

L. **Psychoeducational Assessment** (Three Courses Required)
EDC 577 Ind. Behavior & Personality Assessment 4
AND
EDC 576 Individual Cognitive Assessment 4
AND
+EDC 534 Individual Psych. Evaluation of Exceptional Children 4

M. **Behavior Management** (Required)
EDT 596 Behavior Management. 4

N. **Consultation and Interview Techniques** (Required)
+EDC 578 Consultation in the Schools 4

O. **Counseling Theory and Practice** (Three Courses Required)
EDC 543 Theories & Techniques of Counseling 4
+EDC 583 Theories & Techniques of Group Counseling 4
+EDC 545 Practicum: Counseling Techniques 5

P. **Practicum** (Taken across three terms)
EDC 579 Practicum: Indiv. Assessment & Interven 2
+EDC 579 Practicum: Indiv. Assessment & Intervention .... 5 OR 7

IV. **Statistics & Research Design** (Two Courses Required)

Q. **Statistics**
EDT 638 Educational Statistics 4

R. **Research Design**
EDT 503 Educational Research Methodology 4
OR
EDA 513 Evaluation of Educational & Organizational Systems 4

V. **School Psychology Foundations** (One Course Required)

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 Psychologist 4

VI. **Internship** (12 quarter hours)
+EDC 594/595 Internship in School Psychology 12

VII. **Teaching Certification** (24-29 quarter hours)
+++EDT 526 Math and Science in the Elementary School 4
+++EDT 528 Teaching in the Elementary School 4
+++EDT 544 Reading and Language Arts ..... Elementary School 4
+++EDT 587 Career Education for Persons with Special Needs 3
+++EDT 588 Collaborating with Families, Professionals, and Agencies 4
+++EDT 595 Student Teaching: SLD 5-10

Total hours required for M.S. Degree 63

Total hours required for completion of School Psychology Program and Ohio Certification in School Psychology 103

+ Indicates additional courses (40-42 quarter hours) required beyond the master's degree for program completion and state certification.

++ Indicates additional courses (9 quarter hours) required for students who do not have teaching certification, but who completed at least two years of successful post-bachelor's employment serving clients in a human service agency.

+++Indicates additional courses (24-29 quarter hours) required for students who will obtain SLD teaching certification. Five or ten student teaching credits are required depending on whether the student enrolls for five and ten weeks. (Some of these graduate courses may be waived, and some other courses may be added to meet Ohio general education and curriculum content requirements for teaching certification).

SCHOOL PSYCHOLOGY PROGRAM NOTES

Admission

In addition to the admission criteria described elsewhere (positive references and baccalaureate grade point average of 2.75 or better), school psychology applicants are required to a) take either the Miller Analogies Test (MAT) or the Graduate Record Exam (GRE); b) submit a typewritten statement of their interest in and current perception of the role of the school psychologist; and c) appear for an interview with program faculty and complete an extemporaneous writing exercise.

Admission Prerequisites

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 human services related major AND have completed at least two years of successful full-time employment serving clients in a human service agency. Sample schedule "A" reveals a pattern of courses which is recommended for most school psychology students who already possess teaching certification.

Teaching Certification

Applicants who do not possess either of the above credentials must first obtain an Ohio provisional teaching certificate in learning disabilities at the beginning of their school psychology program. (Most of these courses are already required in the school psychology program.) This requirement is based on the perception that much of the time a school psychologist's client is a classroom teacher, and school psychologists need to be credible and resourceful in their consultations with teachers. Sample schedule "B" reveals a pattern of courses which is recommended for most school psychology students who will first obtain Ohio teaching certification in learning disabilities.

Upon acceptance into the school psychology program, transcripts will be reviewed in order to determine the possibility of waiving some required courses, and to identify any courses which may need to be added or substituted. Such a review must produce a course listing totaling at least 90 quarter hours. Also, it may be necessary for students to add two to four general education or core teacher preparation courses to meet Ohio's teacher certification requirements. For example, students who have an undergraduate major in psychology may not have taken a chemistry, physics, or earth science course, or teacher preparation courses in physical education, art, or music.

Upon obtaining the learning disabilities teaching certificate, it is intended that the graduate student will obtain full-time or part-time employment as a learning disabilities or inclusion teacher or tutor, while completing the remainder of the school psychology courses. In this plan, graduate students will be gaining invaluable teaching experience upon which they will draw when they become school psychologists, and will be earning a salary to help support the remainder of their education.

Applicants with Experience in Human Service Work

Applicants who are not teacher certified but who have completed the equivalent of at least two years of successful employment serving clients in a human service setting need not obtain teaching certification but must, instead, take three courses (9 quarter hours): EDA 511 Curriculum, EDC 539 Administration of Pupil Personnel Services, and EDC 573 Orientation to the School Process.

Residency

All school psychology students must meet a residency requirement by enrolling in coursework on a full-time basis (12 or more quarter hours) for two consecutive terms (e.g., fall and winter, or winter and summer).

Competency Test

To obtain the Ohio certificate in school psychology, students must take the NTE Specialty Area Test #40 (School Psychologist) administered three times each year by Educational Testing Service, and achieve Ohio's passing score. This test is normally taken in March of the internship year.

Internship

Students seeking Ohio School psychology certification who wish to intern in Ohio will be required to sign a statement of intent to work in Ohio as a school psychologist for at least one year following internship.

The State of Ohio limits the number of internships each year to approximately 75 to 100. Of this number, UD receives an average of seven internship slots per year. For students not intending to work in Ohio following internship, internship arrangements may be made in another state.

Fellowships

Fellowships are funded by a federal grant which our school psychology program has obtained, to develop special skills in meeting the assessment and intervention needs of children with severe disabilities. The grant funds six two-year fellowships for school psychology graduate students. The grant will pay all tuition plus a $500 monthly stipend for 24 months. Graduate students will attend a weekly seminar and spend a minimum of 10 hours per week in field experiences. All first-year school psychology students are eligible to apply for the fellowship.

Job Market

Both national and state surveys reveal a shortage of school psychologists and an excellent job market, especially for persons who are able to move to locations where the job shortages are greatest. Job hunting may be more uncertain for persons who are unable to relocate.

Salaries

Starting salaries for beginning school psychologists in Ohio range above $30,000 for 11-month contracts. Experienced school psychologists earn over $50,000.

Accreditation

This program is accredited by the National Association of School Psychologists (NASP) and by the Ohio Department of Education. 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.

DEPARTMENT OF COUNSELOR EDUCATION AND HUMAN SERVICES

COURSES OF INSTRUCTION

EDC 522. INTRODUCTION TO GUIDANCE AND COUNSELING: This course is designed to assist graduate students in building skills and developing understandings relative to the guidance and counseling role of human service practitioners. Essentially, this role consists of assisting children, youth, and adults from diverse backgrounds in reaching their maximum academic and personal development within various educational and community settings. *3 qtr. hrs.*

EDC 523. DELINQUENTS AND JUVENILE COURT: This course examines (1) the Juvenile Court System and (2) underlying ideologies and current debates concerning treatment and/or punishment decisions and (3) children and families at risk of Juvenile Court involvement. *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: Designed to enable the graduate student to acquire the skills and knowledge needed to develop, organize, and utilize a working resource file of local and national organizations and agencies (medical, pastoral, social welfare, mental, educational, industrial, labor, commercial, governmental, and recreational). *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. THE PSYCHOLOGY OF LIFE STYLE AND CAREER DECISION MAKING: Focuses on theories, strategies, information, assessment, and resources to be used in the career counseling of children, youth, and adults. *3 qtr. hrs.*

EDC 530. PSYCHOLOGY OF INDIVIDUAL DIFFERENCES: An overview of diversity in all forms, perceptions of diversity and their importance on society and self. *4 qtr. hrs.*

EDC 531. PSYCHOLOGY OF PERSONALITY DEVELOPMENT: Personality theory and abnormal psychology are discussed with emphasis on dynamic of personal behavior. This course discusses a representative selection of personality theories, personality structure, development, dynamics, maladaptive behavior, and personality change. *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 standards have been developed. Emphasis is given to the cognitive and affective impact upon the individual and family. *4 qtr. hrs.*

EDC 533. PSYCHOMETRICS: A graduate level course designed to foster knowledge and skills related to the principles and application of psychological measurement with emphasis on standardized group tests of intelligence, academic achievement, special aptitude tests, personality measures, interest inventories, and attitude scales. *3 qtr. hrs.*

EDC 534. INDIVIDUAL PSYCHOLOGICAL EVALUATION OF EXCEPTIONAL CHILDREN: This course provides students with insight into the processes necessary for the effective evaluation of special needs individuals. The school psychology student will be exposed to requirements for completing a non-discriminatory and multi-factored assessment and intervention-based assessment. The student will learn specific diagnostic and prescriptive techniques that lead to remediation and intervention as well as classification. *4 qtr. hrs.*

EDC 535. TEST INTERPRETATIONS AND CASE STUDIES: Understanding of the individual through the appraisal techniques of individual and group testing and case study. Tests include a wide range of educational and psychological instruments. Individual differences influenced by elements such as ethnic, cultural, and gender factors are considered. *3 qtr. hrs.*

EDC 536. PERSONALITY AND HUMAN DEVELOPMENT ACROSS THE LIFE-SPAN: Individual growth and development across the life-span are discussed with emphasis on dynamic of personal behavior. This course emphasizes the integrating theme that cognitive structure is an important director of human behavior, and that the understanding of personality requires that we understand the role of cognitive structure personality. While this cognitive perspective is emphasized, the course covers a wide range of concerns to the student of personality across the life-span. It discusses a representative selection of personality theories, personality structure, development, dynamics, maladaptive behavior, and personality change. *3 qtr. hrs.*

EDC 537. DIAGNOSIS AND TREATMENT PLANNING IN COUNSELING: Development of skills related to the use of the current edition of the Diagnostic and Statistical Manual for Mental Disorders as a tool for diagnosing the conditions of clients. Treatment plans designed to guide the counselor's treatment for specific evaluations are examined. *3 qtr. hrs.*

EDC 539. ORGANIZATION AND ADMINISTRATION OF PUPIL PERSONNEL SERVICES: The effective planning, developing and administering a totally balanced and coordinated program of pupil services. *3 qtr. hrs.*

EDC 543. THEORIES AND TECHNIQUES OF COUNSELING: Through analysis of varied theoretical models, skills in counseling will be developed in an integrated approach for modifying the behavior or children, youth, and adults through individual and system change. *4 qtr. hrs.*

EDC 544. PHILOSOPHICAL, PROFESSIONAL, ETHICAL & LEGAL ASPECTS OF COUNSELING: Study of 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. INTRODUCTION TO STUDENT PERSONNEL: This is an entry level course providing an overview of the student affairs profession to include history of the profession, roles of the student affairs practitioner, developmental theory, and legal and ethical issues. *3 qtr. hrs.*

EDC 553. INTERNSHIP IN COLLEGE PERSONNEL SERVICES: Participate as a professional to gain significant practical experience in a student affairs office under the supervision of a practicing professional. The student is required to take a total of 9 quarter hours over 3 quarters. Each internship experience must be at a different site. *9 qtr. hrs.*

EDC 555. ADMINISTRATION AND ORGANIZATION OF COLLEGE STUDENT PERSONNEL PROGRAMS: This course deals with issues of the administration of student personnel programs in colleges and universities and examines the organizational structures associated with the delivery of these programs in the context of current higher education administrative environments. *3 qtr. hrs.*

EDC 571. FOUNDATIONS OF CHILD AND ADOLESCENT NEUROPSYCHOLOGY: Historical models of brain organization. Normal and abnormal neuropsychological development with a focus on functional systems. Basic neuroanatomy. Relationship to learning and school achievement. Special neurological pathologies in children and their impact on learning. Theory, status, research, and clinical applications in pediatric neuropsychology. Screening and referral decisions. Implications for instruction, treatment, and rehabilitation. *3 qtr. hrs.*

EDC 572. ROLE AND FUNCTION OF THE 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. *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 either teaching certificates or at least two years of successful full-time employment experiences serving clients in a human service agency. *2 qtr. hrs.*

EDC 574. INDEPENDENT STUDY: Independent study undertaken with permission of the chairman. *1-3 qtr. hrs.*

EDC 576. INDIVIDUAL COGNITIVE ASSESSMENT: Administration, scoring, evaluation and interpretation of intelligence tests, and their use in conducting multifactored evaluations of children and youth, birth through age 21. (Course limited to those students in psychology programs.) *4 qrt. hrs.*

EDC 577. INDIVIDUAL BEHAVIORAL AND PERSONALITY ASSESSMENT: This course will introduce the school psychology student to the multifactored evaluation process. The assessment focus will be on the pre-referral process, observations of pupil behavior, the use of teacher and parent rating scales, the use of pupil self-rating procedures, the use of interviews with pupils, and direct assessment procedures. Assessment of background information through review of records and through interviews with parents and teachers is included. *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. *4 qtr. hrs.*

EDC 579. PRACTICUM: INDIVIDUAL ASSESSMENT AND INTERVENTION: Assessment and intervention experiences, supportive of tests learned in EDC 534, 576, 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: Guidance in the Elementary is a course for teachers and counselors to discuss concepts and techniques of guidance within the framework of the elementary school. The emphasis is on today's child; child problem situations; theories for understanding child behavior; basic guidance services; roles and responsibilities of personnel; cross-cultural counseling; consulting

with parents, teachers, and administrators; record analysis, observation; pupil-participating assessment techniques; and information dissemination and career education. *3 qtr. hrs.*

EDC 581. TECHNIQUES OF CHILD COUNSELING: This course focuses on practical counseling, consulting, and intervention techniques for specific developmental, social, or behavior problems children experience. The course will provide suggestions for counseling all children, including the exceptional and those who are experiencing special concerns resulting from societal problems. *3 qtr. hrs.*

EDC 583. THEORIES AND TECHNIQUES OF GROUP COUNSELING: Course content focuses on the stages, theories, strategies, and applications of the group counseling process. *4 qtr. hrs.*

EDC 584. PRACTICUM: GROUP COUNSELING: Supervised practice and observation in group counseling techniques. *4 qtr. hrs.*

EDC 594-595. INTERNSHIP IN SCHOOL PSYCHOLOGY: A job-related program for nine months under the immediate supervision of a certified school psychologist. The intern will receive a stipend, made available from the State of Ohio foundation funds. *12 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 EXPERIENCE IN SCHOOL COUNSELING: Extensive directed experience in professional functions within cooperating schools and community organizations. May be taken three times. Prerequisite: permission, department chair. *4 qtr. hrs.*

EDC 600. CULMINATING SEMINAR: This course prepares students to take a comprehensive examination covering the course content of their masters degree program. In addition for students who will seek certification as School Counselors or licensure as Professional Counselors or Professional Clinical Counselors the course serves as a preparation for the competency exams related to these credentials. *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 and cultural and biological factors 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. This incorporates theory (quantitative) and group exercises (qualitative and performative knowledge). *4 qtr. hrs.*

EDC 630. EVALUATION OF EMOTIONAL AND MENTAL CONDITION: Includes the use of assessment procedures in diagnosis, treatment planning, and outcome measurement. Methods of administering and interpreting individual and group standardized tests of mental ability interest, and personality are emphasized. *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 also considered. This incorporates theory (quantitative knowledge) and case studies (qualitative and performative knowledge). *4 qtr. hrs.*

EDC 635. MARRIAGE AND FAMILY COUNSELING: This graduate level course is designed to introduce students to systems theory, the dynamics of human relationships, theories and techniques of marital and family counseling, and professional and legal issues in marital and family counseling. Students will acquire skills and understanding relative to the role of the counselor in assisting families to develop new strategies to solve problems and facilitate individual and family growth. *4 qtr. hrs.*

EDC 655. CAREER GUIDANCE INSTITUTE: Designed to assist counselors, teachers, and administrators in implementing an effective career guidance program and promote a positive working relationship between education and business and industry leaders. *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: This course provides a critical review of theory construction, an overview of a wide range of theories and an understanding of matching the theory to the individual and presenting problem. Includes techniques used with a wide range of populations and conditions. This includes theory (quantitative knowledge), self reflection (qualitative knowledge), and small group exercises (performative knowledge). *4 qtr. hrs.*

EDC 681. INTEGRATIVE APPROACH TO CLINICAL COUNSELING: Assistance for the students in selecting that theory or those aspects of various theories of clinical counseling that best characterize their approach to clients. Emphasis is on the integration of theories with the counselor's personal characteristics and experience. This includes emphasis on self reflection (qualitative knowledge), theory (quantitative knowledge), and counseling exercises (performative knowledge). *4 qtr. hrs.*

EDC 682. COUNSELING MARITAL AND FAMILY CONFLICT: Theories and techniques used in the intervention of serious crisis situations, family violence, child abuse, and other related matters (about two-thirds of class time is devoted to theory — quantitative knowledge and one-third small group exercises — performative and qualitative knowledge). *4 qtr. hrs.*

EDC 683. TREATMENT OF MENTAL AND EMOTIONAL DISORDERS: Presentation of methods utilized in treatment and management of mental disorders including treatment planning, counseling techniques, record keeping, and referral procedures, and use of psychotropic medication. *4 qtr. hrs.*

EDC 684. SPECIAL PROBLEMS IN TREATING THE SEVERELY MENTALLY DISABLED PERSON: Unique needs of the severely mentally disabled persons including the chronic schizophrenic population and a wide spectrum of treatment modalities. This incorporates theory and lecture (quantitative knowledge) with participation and interaction with guest members (qualitative and performative knowledge). *4 qtr. hrs.*

EDC 685. SPECIAL PROBLEMS IN TREATING THE SEVERELY EMOTIONALLY DISTURBED CHILD: Unique needs of the severely emotionally disabled child approaches treatment from a systems approach. This incorporates theory and lecture (quantitative knowledge) with interaction with guest members (qualitative and performative knowledge). *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. This incorporates on-site experience with self-reflection model and case presentations in a senior format (qualitative and quantitative knowledge). *6 qtr. hrs.*

Department of

EDUCATIONAL ADMINISTRATION (EDA)

Charles J. Russo
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

Students are no longer required to participate in Departmental Conferences prior to graduation. In light of possible changes concerning state licensure/certification, the Department is exploring other options in lieu of the Conferences. Students will still be sent a program evaluation questionnaire that they must return to the Departmental office three weeks prior to graduation.

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 (937) 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. Should be taken in the last 15 hours of the program. *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)

Charles J. Russo, 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. *4 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.*

EDA 841. HISTORY, PHILOSOPHY, AND CURRICULUM OF HIGHER EDUCATION: (See EDA 941). *3 qtr. hrs.*

EDA 842. STUDENT CHOICE IN HIGHER EDUCATION: (See EDA 942). *3 qtr. hrs.*

EDA 843. CRITICAL REFLECTION IN HIGHER EDUCATION LEADERSHIP: (See EDA 943). *4 qtr. hrs.*

EDA 844. BUILDING LEARNING COMMUNITIES IN HIGHER EDUCATION: (See EDA 944). 4 qtr. hrs.

EDA 845. PUBLIC POLICY IN HIGHER EDUCATION: (See EDA 945). *4 qtr. hrs.*

EDA 846. LEGAL ISSUES IN HIGHER EDUCATION: (See EDA 946). *3 qtr. hrs.*

PH.D. IN EDUCATIONAL LEADERSHIP (DEL)

The Ph.D. Program in Educational Leadership is designed for elementary and secondary school educators who are committed to providing leadership in the schools (Pre-K-12), and for higher education personnel whose focus is the preparation of elementary and secondary school educators. The program seeks to prepare scholar-practitioners, that is, leaders who 1) value both speculative and practical knowledge and engage in continuous inquiry on professional concerns; 2) deliberate with colleagues upon organizational purposes and the means for achieving them; 3) work selflessly with others; and 4) commit themselves to improving the quality of life within society.

ADMISSION REQUIREMENTS

1. Master's degree.
2. A minimum 3.5 grade point average in a master's degree program.
3. Three letters of recommendation.
4. A minimum score of 40 on the Miller Analogies Test (MAT) or 430 on the verbal and 490 on the analytical sections of the Graduate Record Exam (GRE).
5. Submission of a research paper which was completed during the applicant's master's work.

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—16 qtr. hrs.
Organizational Principles and Issues—12 qtr. hrs.
Personal-Professional Development—9 qtr. hrs.
Program Concentration—21 qtr. hrs.
Cognate Area—18 qtr. hrs.
Total: 100 qtr. hrs.

Residency

The program embodies a full-time residency requirement of two consecutive trimesters on campus. The two terms may be August-May; 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. INQUIRY, THEORY, AND QUALITATIVE RESEARCH: 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 902. INTRODUCTION TO QUANTITATIVE RESEARCH 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 903. STATISTICS AND ADVANCED RESEARCH: Course is designed to extend the focus of EDA 902 with particular emphasis on experimental design methodology and the use of computer programs in analyzing research data. *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.

EDT 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. CULTURE OF THE SCHOOLS: 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 development of the knowledge base and its applicability to leaders who choose to be scholar-practitioners.
3 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 914. ETHICS IN EDUCATIONAL LEADERSHIP: In this doctoral seminar, students carefully examine the moral dimension of decision-making in educational leadership. Particular attention is given to the development of a model for the articulation of moral views and its application to case situations. *4 qtr. hrs.*

EDA 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 THEORY: 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. ORGANIZATIONAL CHANGE AND DEVELOPMENT: 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 924/925. ISSUES IN EDUCATIONAL LEADERSHIP I & II: This Ph.D. residency seminar provides an opportunity for students to integrate their learning from other courses in educational leadership. It is designed to require that each student create his/her own individual synthesis as the entire class develops and justifies their identification of the crucial issues in educational leadership. *4 qtr. hrs.*
over two terms of residency.

EDA 930/931. SEMINAR IN WRITING I & II: The major focus of this two-term course is developing a literature review. Corollary emphases include refining one's writing style, mastering APA, and critiquing the work of others. Prerequisite: Admission to the Ph.D. Program and completion of the core foundations coursework.
4 qtr. hrs.
over two terms of residency.

EDA 932/933. INTERNSHIP I & II: 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. Prerequisite: Admission to the Ph.D. Program and completion of the core foundations coursework. *5 qtr. hrs.*
over two terms of residency

EDA 941. HISTORY, PHILOSOPHY, AND CURRICULUM OF HIGHER EDUCATION: This course examines the evolution of higher education in the United States from the colonial era to the present. Particular attention is given to the purpose(s) and curriculum of higher education as they evolve in American society. *3 qtr. hrs.*

EDA 942. STUDENT CHOICE IN HIGHER EDUCATION: This course examines the factors that influence student choice in higher education, including decisions about attending college, which college to attend, program of study, persistence, and graduate education. The ways in which student choice research can inform the development and refinement of enrollment management, study support services, and academic program development will also be analyzed and discussed. *3 qtr. hrs.*

EDA 943. CRITICAL REFLECTION IN HIGHER EDUCATION LEADERSHIP: This course examines the convergence between the literature on reflective practice, leadership theory, and leadership in higher education. Particular attention is given to the role of critical reflection in improving the practice of leadership in higher education. *4 qtr. hrs.*

EDA 944. BUILDING LEARNING COMMUNITIES IN HIGHER EDUCATION: This course examines the literature on governance in higher education, financial management in higher education, and the use of action inquiry methods. *4 qtr.hrs.*

EDA 945. PUBLIC POLICY IN HIGHER EDUCATION: This course examines the literature on public policy, public finance of higher education, and critical social issues in higher education. It will explore the role of government agencies in the funding and regulation of financial and social issues in higher education. *4 qtr. hrs.*

EDA 946. LEGAL ISSUES IN HIGHER EDUCATION: This course examines the literature on the law and higher education. It will provide a perspective on what active higher education administrators need to know about legal issues. *3 qtr. hrs.*

Department of

HEALTH AND SPORT SCIENCE

Lloyd L. Laubach
Chair of the Department

The Department of Health 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 CRITERIA

Applicants must hold a bachelor's degree from an accredited institution (at least state and regional accreditation), unless specific exceptions are granted by the Associate Dean, and must have attained a baccalaureate degree cumulative average of 2.75 or higher on a 4.0 scale. Students who have less than a 2.75 average may be admitted if they achieve a score of 40 or higher on the Miller Analogies Test (MAT) or scaled scores of 430 or higher on the verbal and 490 or higher on the analytical sections of the Graduate Record Exam (GRE). All applicants must submit three references from qualified professionals in appropriate fields.

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. Students who receive grades of C or less in two courses will be dismissed from the program.

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 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 8 quarter hours of graduate work, including at least HSS 555, Survey of Resarch Processes and Design in Sport Science and HSS 560, Evaluation and Applied Statistics in Sport Science. Application is made by filing the official candidacy form with the Department of Health and Sport Science.

Successful completion of a written comprehensive examination is required for graduation. If the student chooses to write a thesis/research project, the comprehensive examination requirement is waived. The comprehensive examination, four hours in length, will basically cover the student's area of concentration (Sport Science courses.) The comprehensive 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 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
HSS 555	Survey of Research Processes & Design in Sport Science	4
HSS 560	Evaluation & Applied Statistics in Sport Science	4

Area of Concentration—Sport Science ..... 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
- HSS 510 History of Physical Education 4
- HSS 519 Sport and Art 3
- HSS 540 Minorities in Sport 4
- HSS 575 Individual Studies in Sport Science 1-8

II. Administration: Methodology
- HSS 523 Curriculum Development in Sport Science 3
- HSS 529 Innovative Practice in Sport Science 3
- HSS 547 Administration of Interscholastic and Intramural Athletics 3
- HSS 548 Safety and the Law in the Sport Sciences 3
- HSS 556 Issues in Sport Science (Seminar) 3
- HSS 575 Individual Studies in Sport Science 1-8

III. Scientific Basis
- HSS 531 Nutrition for Exercise/ Sport. 4
- HSS 537 Biomechanics 4
- HSS 538 The Nature and Basis of Motor Skill Acquisition .3
- HSS 539 Vitamins and Minerals .. 4
- HSS 550 Physiological Responses to Exercise 4
- HSS 551 Laboratory Techniques for the Practitioner in Sport Science 3
- HSS 563 Advanced Statistics in Sport Science 4
- HSS 575 Individual Studies in Sport Science 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

HSS 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.*

HSS 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.*

HSS 510. HISTORY OF SPORT AND PHYSICAL ACTIVITY: Study of the development of sport and physical education from early cultures to the present time. Emphasis on the United States. *4 qtr. hrs.*

HSS 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.*

HSS 518. STUDENT TEACHING: Course consists of teaching physical education under supervision in elementary, middle, or high school. *10 qtr. hrs.*

HSS 519. SPORT AND ART: An overview of sport as it is interpreted in selected pieces of literature, painting, and sculpt art, and film and theater. *3 qtr. hrs.*

HSS 523. CURRICULUM DEVELOPMENT IN SPORT SCIENCE: Principles and procedures for curriculum construction and revision; criteria for selecting activities and judging outcomes; the place of sport science within the total curriculum. *3 qtr. hrs.*

HSS 529. INNOVATIVE PRACTICES IN SPORT SCIENCE: Practical and theoretical study of innovative methods of teaching physical activities. *3 qtr. hrs.*

HSS 530. BASIC ATHLETIC TRAINING: Application of principles and methods involved in prevention, care and treatment of athletic injuries. *4 qtr. hrs.*

HSS 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. *4 qtr. hrs.*

HSS 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.*

HSS 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.*

EDA 539. VITAMINS AND MINERALS: To examine the metabolic and physiologic functions of vitamins and minerals in human metabolism. *4 qtr. hrs.*

HSS 540. MINORITIES IN SPORT: A study of the historical, psychological, sociological and biophysical aspects of the American woman in sport. *4 qtr. hrs.*

HSS 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.*

HSS 548. SAFETY AND LAW IN THE SPORT SCIENCES: 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. *3 qtr. hrs.*

HSS 550. PHYSIOLOGICAL RESPONSES TO EXERCISE: A study of the physiological changes that occur during exercise and training. *4 qtr. hrs.*

HSS 551. LABORATORY TECHNIQUES FOR THE SPORT SCIENCE PRACTITIONER: The practical application of selected sport science tests and measurements. Emphasis will be placed on human performance (strength, cardiovascular, flexibility, and body composition) testing. *3 qtr. hrs.*

HSS 554. WOMEN'S HEALTH ISSUES: Explores the myriad of health problems and concerns facing today's women. The focus is on person from physical, emotional and spiritual perspectives. *3 qtr. hrs.*

HSS 555. SURVEY OF RESEARCH PROCESSES AND DESIGN IN SPORT SCIENCE: This course is designed to develop an understanding of the nature of the general field of sport science 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.*

HSS 556. ISSUES IN SPORT SCIENCE (SEMINAR): A seminar to investigate and report on a specific issue in sport science. *3 qtr. hrs.*

HSS 560. EVALUATION AND APPLIED STATISTICS IN SPORT SCIENCE: Application of descriptive and inferential statistics to sport science tests and measurements. Qualitative and quantitative analysis of selected physical fitness, motor performance, and body composition data. *4 qtr. hrs.*

HSS 561. DEATH EDUCATION/ LIVING: Emphasis is on "education for healthy living" which is accomplished by bringing the subject of death into reality and comfort. Field trips, group sharing, and guest speakers are highlights. *3 qtr. hrs.*

HSS 563. ADVANCED STATISTICS IN SPORT SCIENCE: Learning the theory and hands-on applications of various social science statistical analyses to include: independent and dependent groups t-test, analysis of variance and covariance, multiple aggression and non-parametric analyses. *4 qtr. hrs.*

HSS 575. INDIVIDUAL STUDIES IN SPORT SCIENCE: Individual investigations of a problem in sport science. Students may not register for HSS 575 without having completed HSS 555 and HSS 560. *1-8 qtr. hrs.*

EDH 576. INDIVIDUAL STUDIES IN HEALTH: Individual investigations of a problem in health. Students may not register for HSS 576 without having completed HSS 555 and HSS 560. *1-4 qtr. hrs.*

HSS 582 . INTERNSHIP IN SPORT SCIENCE: A job-related experience under the immediate supervision of personnel from a local school or community organization. *4 qtr. hrs.*

HSS 591. RESEARCH PROJECT: Action research initiated after consultation with advisor. A systematic study of a specific problem. Prerequisite for registration: Completion of HSS 555 and 560 and approval of preliminary plan. *1-6 qtr. hrs.*

Department of

TEACHER EDUCATION (EDT)

C. Daniel Raisch
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.

Some programs are offered at the Capital off-campus center. Students should contact the Assistant Chair, Department of Teacher Education, to determine which program concentrations are available.

ADMISSION REQUIREMENTS

(See School of Education requirements)

In addition to the School of Education requirements, students who wish to pursue a graduate degree or complete a licensure/endorsement program must be admitted into Graduate School.

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 and must have all preprequisites and program requirements satisfied.

DEGREE REQUIREMENTS

To earn a master's degree the student is required to complete a minimum of 45 quarter hours and maintain a grade point average of 3.0 or higher. Eight quarter hours of UD workshops are permitted if they are applicable to a student's program. Workshop courses from other universities cannot be accepted in transfer.

CORE REQUIREMENTS FOR THE MASTER'S DEGREE

		Quarter Hours
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	Thesis	5
OR		
4. EDT 671	Research Seminar	2
AND one of the following		
EDC 533	Psychometrics	3
EDC 535	Test Interpretations and Case Studies	3
EDT 511	History of Education	4
EDT 638	Educational Statistics	4

Notes

1. *EDT 503 is a prerequisite for EDT 670, and EDT 671.*
2. *EDT 503 should be taken after the 30th quarter hour of coursework has been completed.*

CONCENTRATION REQUIREMENTS

Art Education *Quarter Hours*

VAH 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	8-9

Note:
Students interested in the Art Education Program should make an appointment to meet with Dr. Mary Zahner.

Technology in Education

Quarter Hours

EDT 538	Introduction to Technology in Education *(See Note 1)*	4
EDT 539	Technology in Education *(See Note 1)*	4
EDT 540	Advanced Technology in Education	4
EDT 541	Methods: Technology in Education	4
EDT 542	Topics in Technology	1-4
	Approved Electives	7-8

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 on-campus computer workshop/course experiences.*

Middle Childhood Education

Quarter Hours

Approved Concentration Courses	20
Approved Electives	7-8

Note:
The completion of this program does not result in a middle childhood education license. It is designed for middle school teachers who wish to acquire the knowledge, skills, and attitudes to help them become more competent professionals. The concentration courses and electives are determined by the student and the student's advisor.

INTERDISCIPLINARY

Quarter Hours

——	——	Approved Concentration Courses in Education 16
——	——	Approved Concentration Courses outside Education 11-12

Note:
Students in the Interdisciplinary program normally select from courses offered by two or more departments in the University. <u>One of those departments must be outside the School of Education.</u>

Literacy (Reading)

The following courses are required for the reading endorsement and the master's degree in Reading/Language Arts:

Quarter Hours

EDT 545	Advanced Study in Reading/LA	4
EDT 546	Issues, Trends, and Research in Reading	4
EDT 543	Advanced Children's Literature	4
	OR	
EDT 555	Adolescent Literature	4
EDT 547	Assessment & Evaluation of Reading Difficulties	4
EDT 548	Practicum in Reading Intervention Techniques	4
EDT 554	Critical Reading in the Content Areas	3
	Total Quarter Hours	23

Notes

1. EDT 547 and EDT 548 are taken concurrently. Prerequisites for these courses are EDT 545 and EDT 543 or 555.
2. Passing the NTE Specialty Area Test, *Introduction to the Teaching of Reading*, is required before one can apply for the reading encorsement. The endorsement is limited to the age and grade levels listed on the teacher licensure to which you are adding this endorsement.
3. To obtain the reading endorsement the student must complete all the courses listed above. If a student wishes to earn a master's degree with a concentration in Reading/Language Arts, the student must complete all of the reading courses as listed above, complete the core courses, obtain a minimum of 45 quarter hours, and adhere to the other requirements needed for the degree as outlined in the current graduate bulletin.
4. EDT 549 Phonics (4 quarter hours) or its equivalent is a prerequisite for the concentration and/or endorsement.

Adolescence to Young Adult Education

Quarter Hours

Approved Concentration Courses	22
Approved Electives	5-6

Note:
The completion of this program does not result in an adolescence to young adult license. It is designed for teachers who work with this age group and wish to acquire the knowledge, skills, and attitudes to help them become more competent professionals. The concentration courses and electives are determined by the student and the student's advisor.

Teacher as Leader

Required Concentration (28 hrs.)

Quarter Hours

EDA 505	Educational Leadership	4
EDA 509	Supervision	4
EDA 511	Curriculum	4
EDA 515	School Law I	3
EDT 513	Professional Development of Teacher Leaders	3
EDT 511	History of Education in the United States	4
EDT 505	Human Relations	3
EDT 522	Introduction to Guidance	3

Middle Childhood License

This is a permission-only licensure

program. Students interested in this license must contact the program advisor before enrolling in it. Call (937) 229-3348 for the name of the advisor.

Adolescent to Young Adult License
This is a permission only licensure program. Students interested in this license must contact the program advisor before enrolling in it. Call (937) 229-3348 for the name of the advisor.

Intervention Specialist License
This is a permission only licensure program. Students interested in this license must contact the program advisor before enrolling in it. Call (937) 229-3348 for the name of the advisor.

Transdisciplinary Early Childhood Education
This graduate program is designed to prepare individuals who seek to work with young children and their families.

This program is intended to lead to a Master's of Science in Education with a specialization in Transdisciplinary Early Childhood Education from the University of Dayton as well as the following proposed Ohio Department of Education teaching licenses. It is also possible to meet the requirements for the Early Intervention Certificate awarded by the Ohio Department of Health and Human Services in conjunction with the Board of Mental Retardation and Developmental Disabilities.

1. **Early Childhood License:**
   Valid for teaching children who are typically developing, at-risk, gifted, and who have mild to moderate educational needs. Licenses shall be issued for ages three through eight and prekindergarten through grade three.

2. **Early Intervention Specialist License:**
   Valid for teaching learners with mild/moderate/intensive educational needs from ages three through eight and prekindergarten through grade three, and for providing service coordination.

3. **Early Intervention Certificate:**
   Valid for servicing infants and toddlers, ages birth through 2, who have an identified developmental delay or who are at risk for developing such a delay. The young child is served within the context of its family.

Prerequisite courses for the Early Childhood and Early Intervention Specialist licenses are EDT 504 and EDT 590. To be eligible for either of these licenses the courses in the following section must be completed as part of an initial certification program or upon the completion of the licensure related coursework.

Prerequisites:
EDT 207 or 504. Human Development *3 (4) qtr. hrs.*

EDT 390/590. Educating Diverse Student Populations in Inclusive settings *3 (4) qtr. hrs.*

Corequisites:
EDT 391/691. Language Development *2(3) qtr. hrs.*

EDT 415/515. Early Childhood Theory and Practice *3 (4) qtr. hrs.*

EDT 418/518. Integrated Curriculum and Instruction for Kindergarten & the Primary Grades *3 (4) qtr. hrs.*

EDT 425/525. Literacy for Kindergarten & the Primary Grades *3 (4) qtr. hrs.*

EDT 473/573. Guided Practicum for Kindergarten & the Primary Grades *4(5) qtr. hrs.*

EDT 504 and 590 must be taken within the past five years. Evidence of 300 field hours needs to be provided.

Bold and italics indicate coursework for the Early Intervention option.

EDT 517. Intro. to Transdisciplinary Early Childhood Education. *4 qtr. hrs.*

EDT 524. Emerging Literacy *3 qtr. hrs.*

EDT 525. Summer Play Institute. *3 qtr. hrs.*

EDT 527. Developmentally & Individually Appropriate Practice. *3 qtr. hrs.*
(Or EDT 535. Cur. and Instr. for Infants and Toddlers with Special Needs Early Inter. only)

EDT 579. Collaborative Assessment: B to 8 4 qtr. hrs.
(And EDT 514. Infant/Toddler Development Practicum. Early Inter. only)

EDT 588. Collaborating with Families, Professionals, and Agencies *4 qtr. hrs.*

EDT 586. Early Childhood Seminar on Med. and Health Issues *3 qtr. hrs.*

EDT 549. Phonics (Not for EI) *4 qtr. hrs.*

EDT 523. Internship in Inclusive Early Childhood (5 weeks) *5 qtr. hrs.*
(Or EDT 522. Internship in Early Intervention 5 Early Interven. only)

Additional Certification Programs
The Department of Teacher Education also offers certification through graduate coursework in the following areas: Developmental Handicaps, Multi-handicaps, Specific Learning Disabilities, and Kindergarten-Primary. Persons interested in pursuing these certifications should contact the Dean's office (Undergraduate Secretary) or the certification secretary.

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 Clincial 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: completion of 30 qtr. hrs. *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 508. CURRENT ISSUES IN EDUCATION: Study of selected controversies in education as they relate to policy and practice. *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 AND TODDLER DEVELOPMENT PRACTICUM: This guided practicum will provide an opportunity for students to develop and apply their knowledge of typical and atypical development from conception to age 3 as they observe young children in both structured and naturalistic settings. Developmental milestones as well as related risk factors will be emphasized. Prerequisite: EDT 517
Clinical Hours: 0
Field Hours: 40 *3 qtr. hrs.*

EDT 517. INTRODUCTION TO INCLUSIVE EARLY CHILDHOOD EDUCATION: An introduction to the theory base which drives developmentally appropriate practice for working with young children birth through age 8 and their families. Students will explore educational models and current issues associated with the field of early childhood education. This course serves as an introduction to early childhood special education and the risk factors that are common for young children who are served in these programs. Prerequisites: EDT 504 & 590
Clinical Hours: 10
Field Hours: 10 *4 qtr. hrs.*

EDT 518. 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. *4 qtr. hrs.*

EDT 522. INTERNSHIP IN EARLY INTERVENTION (Ages Birth to 3). Supervised and evaluated teaching in an infant/toddler educational setting. Students are to demonstrate the knowledge, skills, attitudes, and values needed to comply with the National Association for the Education of Young Children (NAEYC) and the Division for Early Childhood of the Council of Exceptional Children (DEC) guidelines for appropriate practice. Prerequisites: EDT 514, 524, 525, 535, 579, 586 and 588.
Clinical Hours: 0
Field Hours: 150 *5 qtr. hrs.*

EDT 523. INTERNSHIP IN TRANSDISCIPLINARY EARLY CHILDHOOD EDUCATION (Ages 3 to 5). Supervised and evaluated teaching in an integrated preschool setting. Students are to demonstrate the knowledge, skills, attitudes, and values needed to comply with the National Association for the Education of Young Children (NAEYC) and the Division for Early Childhood of the Council of Exceptional Children (DEC) guidelines for appropriate practice.
Clinical Hours: 0
Field Hours: 150
Prerequisites: EDT 524, 525, 527, 579, 586 and 588. *5 qtr. hrs.*

EDT 524. EMERGING LITERACY: This course provides an in-depth study of developmentally appropriate practice as it is associated with emerging literacy. Taken in conjunction with the Summer Play Institute, students have the opportunity to develop and implement activities that involve early literacy and integrated curricula.
Clinical Hours: 10
Field Hours: 0
Prerequisite: EDT 517 *3 qtr. hrs.*

EDT 525. SUMMER PLAY INSTITUTE. The Summer Play Institute is a field-based forum in which students implement the language experiences and integrated curriculum activities developed in EDT 524. Students will engage in child-initiated play sessions which will be video-taped and re-

viewed by peers, play facilitators, the instructor and the student. Supported play which facilitates development will be emphasized. *3 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. Clinical and field experience. *4 qtr. hrs.*

EDT 527. DEVELOPMENTALLY AND INDIVIDUALLY APPROPRIATE PRACTICE: This course shifts focus from age appropriate practice to the needs of the individual child and family. Students will learn to develop practice which supports and facilitates the development of young children ages 3 to 8—specifically those with disabilities. Significant review of related research drives this course.
Prerequisites: EDT 524 and 525
Clinical Hours: 10
Field Hours: 10 *3 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 504. For initial certification students. *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 teacher. Weekly seminar.
Prerequisites: Formal approval must be obtained a full term in advance, and required methods courses must have been completed. *5-10 qtr. hrs.*

EDT 535. CURRICULUM AND INSTRUCTION FOR INFANTS AND TODDLERS WITH SPECIAL NEEDS Planning, instructional methods, materials and evaluation techniques for working with young children (birth-3) and their families.
Prerequisite: EDT 514
Clinical Hours: 10
Field Hours: 20 *4 qtr. hrs.*

EDT 538. INTRODUCTION TO TECHNOLOGY 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 Macintosh system software, word processing skills, simple computer graphics, evaluation of computer software, and ethical and legal issues of software use in the classroom. *4 qtr. hrs.*

EDT 539. TECHNOLOGY 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 spread sheet, data base, teacher utilities for classroom management and instruction, and on sharing effective uses of computers and technology with other users. *4 qtr. hrs.*

EDT 540. ADVANCED TECHNOLOGY IN EDUCATION: This course includes integration of computers and related technology into teaching in all subject areas. Also covered are criteria for effective software and hardware and creation of teaching, evaluation, and management instruments. *4 qtr. hrs.*

EDT 541. METHODS: TECHNOLOGY IN EDUCATION: The focus of this course is planning, diagnosis, instructional methods, materials, and evaluation techniques for teaching computer science, K-12 curriculum in computer/technology literacy, the educational technology resource person, and establishing and maintaining technology facilities in schools are also included. Field and clinical experience required. *4 qtr. hrs.*

EDT 542. TOPICS IN TECHNOLOGY: The course is an examination of current issues and topics of emerging technologies with direct application to the educational setting, including Internet, Contemporary Issues in Teaching, or Independent study. *4 qtr. hrs.*

EDT 543. ADVANCED CHILDREN'S LITERATURE: 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. Clinical and field experience. *5 qtr. hrs.*

EDT 545. ADVANCED STUDY IN READING/LANGUAGE ARTS: Designed to provide teachers the opportunity to extend and update their knowledge of the reading/language arts processes and the principles underlying effective instruction. Key concepts are drawn from recent research and theory in language learning, developmental reading research, and research describing the composing processes of children. *4 qtr. hrs.*

EDT 546. ISSUES, TRENDS, AND RESEARCH IN READING: A basic course for teachers concerned with the psychology of learning to read and current issues, trends, and research in the area of reading/language arts. *4 qtr. hrs.*

EDT 547. ASSESSMENT & EVALUATION OF READING DIFFICULTIES: Study of formal and informal diagnostic tests and procedures for identifying reading strengths and weaknesses with applications for reading programs across grade levels. Field experience. Summer term.
Prerequisites: EDT 545 and EDT 543 or EDT 555. Corequisite: EDT 548. *4 qtr. hrs.*

EDT 548. PRACTICUM IN READING INTERVENTION TECHNIQUES: Laboratory portion of EDT 547. Summer term. Corequisite or Prerequisite: EDT 547. *4 qtr. hrs.*

EDT 549. PHONICS: Participants will learn to assist students in mastering spelling, phonics, and writing skills within a holistic program. *4 qtr. hrs.*

EDT 554. CRITICAL READING IN THE CONTENT AREAS: Exploration of the problems of developing vocabulary and critical reading ability in a variety of curriculum areas across grade levels. *3 qtr. hrs*

EDT 555. ADOLESCENT 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 into the curriculum. *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. For initial certification students. *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. For initial certification students. *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. For initial certification students. *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. *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. For initital certification students. *4 qtr. hrs.*

EDT 570. SCHOOL, SELF, AND SOCIETY: Study of the relationship between institutional reform, personality development, and social change; comparison of rural, urban, and suburban schools and social settings; study of the laws and policies affecting the education of students with disabilities. Field and clinical experience. *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: Formal approval must be obtained a full term in advance, and required methods courses must have been completed. *5-10 qtr. hrs.*

EDT 579. COLLABORATIVE ASSESSMENT: BIRTH TO AGE 8: Study of the transdisciplinary and collaborative nature of assessment in the diagnosis, screening, and instruction of young children (birth to age 8) who are typically developing as well as those with disabilities. The course will focus on the role of the family in the assessment process. Systematic observation using a play-based approach will be emphasized.
Prerequisite: EDT 527
Clinical Hours: 20
Field Hours: 0 *4 qtr. hrs.*

EDT 580. PSYCHOLOGY AND EDUCATION OF PERSONS WITH MENTAL RETARDATION: Study of identification, characteristics, learning theories, and curriculum planning appropriate to the mentally retarded. Field and clinical experience. Prerequisite: EDT 590. *4 qtr. hrs.*

EDT 581. ASSESSMENT OF THE LEARNER WITH SPECIAL NEEDS: 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. EARLY CHILDHOOD SEMINAR ON MEDICAL AND HEALTH ISSUES: Study of the health care needs and medical aspects of disabilities associated with young children. This course is taught at Children's Medical Center where health care professionals serve as invited speakers and where medical technology is available.
Prerequisites: EDT 527 or 535, EDT 579 and 588
Clinical Hours: 10
Field Hours: 10 *3 qtr. hrs.*

EDT 587. CAREER EDUCATION FOR PERSONS WITH SPECIAL NEEDS: Theory and techniques of job classification, assessment, selection,

placement, and activities related to work experience from pre-school to adult. Prerequisite: EDT 590 or may be taken concurrently. *3 qtr. hrs.*

EDT 588. COLLABORATING WITH FAMILIES, PROFESSIONALS, AND AGENCIES: A study of the collaborative group process needed to effectively include parents, educators, and professionals from agencies in the educational decision-making process. Family systems theory and family empowerment will be the focus of the course. Students will learn the difference between the Individual Family Service Plan (IFSP) process and the Individualized Education Plan (IEP) process. Prerequisites: EDT 579 and 590
Clinical Hours: 20
Field Hours: 0 *4 qtr. hrs.*

EDT 590. EDUCATING DIVERSE STUDENT POPULATIONS IN INCLUSIVE SETTINGS: Study of special needs learners and the learning challenges they face in classrooms; resources, curricular modifications, and instructional strategies that facilitate learning in general educational settings. *4 qtr. hrs.*

EDT 592. CURRICULUM AND METHODS — MR: Curriculum development, instructional materials, and evaluation techniques and individual programming for students with special needs. Field and clinical experience. Prerequisite: EDT 580. *4 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. CURRICULUM AND METHODS: Instructional strategies, materials, and evaluation techniques for teaching students with special needs. 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. Clinical experience. 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 with 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. Field and clinical experience. *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.*

**Course not offered on a regular basis*

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. CURRENT TOPICS IN TEACHING: Issues of current national or regional interest to teachers (i.e. accountability, testing of teachers, etc.) are studied. (Workshops) *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 670. MASTER'S THESIS: 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 671. RESEARCH SEMINAR: Implementation of a planned informal research study individually or with a small group. Prerequisite: EDT 503. *2 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. Clinical and/or field experience. *3 qtr. hrs.*

EDT 691. LANGUAGE DEVELOPMENT: Study of language development in children with implications for the learner with special needs 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 808/908. 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 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. CULTURE OF THE SCHOOLS: 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.*

EDT 914. ETHICS IN EDUCATIONAL LEADERSHIP: In this doctoral seminar, students carefully examine the moral dimension of decision-making in educational leadership. Particular attention is given to the development of a model for the articulation of moral views and its application to case situations. *4 qtr. hrs.*

**Course not offered on a regular basis*

X SCHOOL OF ENGINEERING

Joseph Lestingi, Dean
Donald Moon, 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
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 a master's degree program in the School of Engineering, a student should have received an undergraduate degree from an accredited program in engineering, physics, chemistry, or applied mathematics, and should have earned a minimum of a 3.0 cumulative grade point average based on a 4.0 scale. Students who apply to a graduate program different from their undergraduate degree may be required to complete undergraduate courses in the new area.

Students whose grade point average is below a 3.0 will be considered for acceptance on a conditional basis, in which case particular attention will be given to their last 60 semester hours of undergraduate course work, engineering experience, and recommendations. In some cases a limited number of undergraduate courses may be required to show competence in engineering sciences and design. Those who do not have an undergraduate degree in the above areas may be required to take additional semesters of undergraduate work. All undergraduate prerequisites should be completed satisfactorily before graduate courses are taken.

The minimum mathematics requirement is three semester hours of differential equations. Computer literacy is expected. In addition there may be special department requirements.

Acceptance into a graduate program must be approved by the department chair or program director and the Associate Dean of Graduate Engineering Programs and Research.

Unclassified Status

Students anticipating acceptance into a degree granting program may register for only six semester hours of graduate course work without approval of the associate Dean of Graduate Engineering Programs and Research. There is no guarantee that any hours taken before acceptance will count toward a degree. An application for graduate study should be submitted as soon as possible to ensure that courses taken are compatible with degree requirements. Performance in graduate courses taken before acceptance to a graduate program does not change admission requirements.

Advising

Each student accepted into a master's program is assigned an academic advisor. A change of academic advisor is permissible upon request of the student. The academic advisor shall be a member of the program faculty and be approved by the department chair or program director, and the Associate Dean of Graduate Engineering Programs and Research. The academic advisor will assist the student in the preparation of a plan of study.

Plan of Study

A student must complete a minimum of 30 semester hours of graduate work. The specific courses should be itemized and approved on a plan of study form to be submitted to the Office of Graduate Engineering Programs and Research, prior to registration for the 10th graduate semester hour (excluding transfer credits), or before registration for the third semester. It is the student's responsibility to obtain approval from the academic advisor for any changes in the plan of study and to submit to the academic advisor all deletions and additions in written form before the fourth week of the student's final semester. The plan of study and any amendments must be approved by the student's academic advisor, the department chair or program director, and the Associate Dean of Graduate Engineering Programs and Research.

Transfer of Credit

Up to 6 semester hours, or the equivalent, of graduate studies outside the University of Dayton may be accepted toward the master's degree. The transfer credit must be of B or higher grade level, cannot have been used to satisfy the requirements of an undergraduate degree, and must be verified by an official transcript from the granting institution. It is the responsibility of the student to have the transcript(s) sent to the Office of Graduate Applications & Records.

Thesis

Each student whose plan of study requires a thesis must prepare it in accordance with the format outlined in A Manual for the Preparation of Graduate Thesis and Dissertation, copies of which are available in the Office of Graduate Applications & Records, and in the Office of Graduate Engineering Programs and Research. The thesis must be based on the student's own work. Joint authorship is not permitted. The thesis advisor's responsibilities are supervising and approving the work, and assisting in forming the thesis committee and scheduling a defense. The thesis advisor may or may not be the academic advisor. The thesis defense may be either oral or written or both. The thesis must be presented to and approved by a committee of at least three members, at least one of whom is on the graduate faculty. The committee must receive the thesis at least one week prior to an oral defense. No student shall be allowed to defend the thesis more than twice.

A pass/failed grade will be assigned to the quality of the work. A final approved copy of the thesis is due in the Office of Graduate Engineering Programs and Research no later than one week before graduation.

Academic Standards

Master's degree students are required to maintain and graduate with a minimum cumulative grade point average of a B (3.0) in course work, with no more than six semester hours of C. Grades received from a thesis are passed/failed, and do not count toward the minimum grade point average of 3.0. Students who fail to meet these standards are placed on academic probation or dismissed from the program.

Time Limit

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

ACCELERATED MASTER'S PROGRAM

University of Dayton students who have demonstrated above-average scholastic achievement during their first three years of undergraduate work are eligible to participate in an accelerated program leading to a master's degree. The student may take graduate courses that satisfy master's degree requirements while finishing the bachelor's degree. All other School of Engineering and department/program requirements apply to the accelerated master's program. Undergraduate students who are interested in this program should contact their department chair.

ADDITIONAL REQUIREMENTS

Any other specific requirements and sequences leading to these degrees are described in the following sections or in departmental and program documents.

DOCTORAL DEGREES

The School of Engineering offers programs leading to the Doctor of Philosophy (Ph.D.) in Engineering and in Electro-Optics, and Doctor of Engineering (D.E.). The programs leading to the Ph.D. in Engineering and D.E. degrees encompass major fields of study in Aerospace Engineering, Electrical Engineering, Materials Engineering, and Mechanical Engineering.

DOCTOR OF PHILOSOPHY (Ph.D.)

The Ph.D. is granted in recognition of superior achievement in independent research and course work. The research must demonstrate that the student possesses capacity for original thought, talent for research, and ability to organize and present findings.

The minimum credit hours required for the Ph.D. degree are 60 semester hours beyond the master's degree. This includes a minimum of 30 semester hours for the Ph.D. dissertation and a minimum of 30 semester hours of course work. A Ph.D.-seeking student is required to complete a minimum of 12 semester hours in advanced mathematics.

The Ph.D. dissertation must either add to the fundamental knowledge of the field or provide a new and better interpretation of facts already known. It is expected to result in one or more manuscripts suitable for publication in a refereed journal.

DOCTOR OF ENGINEERING (D.E.)

The D.E. is granted in recognition of superior achievement in course work and an independent project. The project

will usually be broad in scope, involve more than one discipline or subdiscipline, and be closely tied to an industrial-like application.

The minimum credit hours required for the D.E. degree is 60 semester hours beyond the master's degree. This includes a minimum of 21 semester hours credit for the D.E. dissertation and a minimum of 39 semester hours of course work. A D.E.-seeking student is required to complete a minimum of 21 semester hours in the major (covering the domains of at least two subdisciplines), 9 semester hours in advanced mathematics and 9 semester hours in a synergistic area of engineering or science.

The D.E. dissertation must address an integrated industrial-like project. It is expected to result in a manuscript suitable for publication in an applied engineering journal and/or to documentation leading to a patent.

Admission Requirements

Normally, a student must earn a master's degree in the same or related area before being admitted to the doctoral program. Only the most promising students with a graduate GPA of 3.2/4.0 or above and good academic references may be admitted. Additional admission requirements may be stipulated by the individual graduate program. Admission means only that the student will be permitted to pursue a doctoral plan of study. The student's admission to doctoral study does not imply that the student will be admitted to candidacy or will be able to achieve the doctoral degree.

Temporary Advisor

Immediately upon admission into the doctoral program, a student shall be assigned a temporary advisor. This temporary advisor will assist the student in the initial selection of courses for the first semester of enrollment.

Doctoral Advisory Committee

Before the end of the first enrolled semester, the student, in consultation with the department chair or program director, selects a major professor to serve as the chair of the doctoral advisory committee. The chair of the doctoral advisory committee will be a member of the graduate faculty. An advisory committee, consisting of the chair and at least two other graduate faculty members from the programs of the School of Engineering, will then be recommended for approval to the department chair or program director and to the associate dean of graduate engineering programs and research. Appointment of additional members of the committee from outside the student's program (i.e., other university faculty, adjunct professors, prominent researchers in industry or government) is encouraged. One additional graduate faculty member may be appointed by the Associate Dean of Graduate Engineering Programs and Research. The composition of the committee will generally reflect the student's area of study and research interest. The duties of the doctoral advisory committee shall include advising the student, assisting the student in preparing the program of study, administering and reporting the candidacy examination, assisting in planning and conducting research, approving the dissertation, and conducting and reporting the results of the dissertation defense. A dissertation advisor other than the chair of the doctoral advisory committee may be appointed by the doctoral advisory committee.

Plan of Study

The plan of study shall include all the specific courses beyond the master's degree that the student is required to complete. The plan shall indicate the time and manner in which these requirements are to be met. It is to be completed and approved by the doctoral advisory committee, the department chair or program director, and the Associate Dean of Graduate Engineering Programs and Research, before the end of the second semester of the student's enrollment.

Residency Requirement

After admittance to a doctoral program, the student must complete the residency requirements to be considered for the candidacy examination. This requirement must be met by completing 21 semester hours of graduate course work in four or fewer consecutive semesters which may or may not include the Summer.

Candidacy Examination

The candidacy examination for the doctoral degree is generally 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 doctoral degree. It will include two parts: (1) a written and an oral examination covering the domain of course work; and (2) an oral examination on the dissertation proposal. Part 2 must be completed within six months of the completion of part 1. At the discretion of the doctoral advisory committee, part 2 examination can be taken simultaneously with the oral portion of the part 1 examination.

The proposal outlining in detail the proposed area of dissertation research should clearly show the review of the literature in the area, the need for and the uniqueness of the research, the general approach, expected results, the laboratories and/or other facilities needed, and a schedule of work. No more than 6 semester hours of dissertation can be taken prior to successful presentation of the dissertation proposal. The student must make a copy of this proposal available to each doctoral advisory committee member at least one week prior to the part 2 examination.

The student must pass all parts of the examination to be admitted to candidacy. The student is considered to have passed only when the decision of the doctoral advisory 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 Associate Dean of Graduate Engineering Programs and Research. If any part of the examination is unsatisfactory, 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 the submission of the examination report.

A student must pass the candidacy examination at least six months prior to the dissertation defense.

Dissertation

A single author dissertation is required of each doctoral candidate who has passed the candidacy examination. The dissertation topic will be selected by the student in consultation with the advisor and the doctoral advisory committee. The dissertation topic must be approved by the doctoral advisory committee. The dissertation must be prepared in accordance with the instructions outlined in A Manual for the Preparation of Graduate Theses and Dissertations, copies of which are available in the office of Graduate Engineering Programs & Research or the office of Graduate Applications & Records. A manuscript prepared for an appropriate journal and an acknowledgment of receipt by the editor must also be submitted along with the dissertation.

The student must obtain approval from the doctoral advisory committee to undertake all or part of the dissertation in absentia. A letter requesting such permission, signed by the chair of the doctoral advisory committee, must be submitted to the Associate Dean of Graduate Engineering Programs and Research. This letter should outline 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.

The dissertation, three copies of the dissertation in final form, the journal manuscript and acknowledgment of receipt by the editor, and an abstract not to exceed 350 words must be submitted to the office of Graduate Engineering Programs & Research at least three weeks before the graduation date 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 shall be filed in the Roesch Library.

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. A fee will be assessed for the cost of copyrights.

Dissertation Defense

No earlier than six months after the successful candidacy examination, the candidate shall defend the doctoral dissertation in a public forum to demonstrate to the committee that all the preparation for which the doctoral degree is awarded has been met. The defense is open to all members of the University of Dayton faculty, student body, and interested outside parties. The members of the doctoral advisory committee, with the advisor acting as chair, will conduct this dissertation defense.

Before the announcement of this defense, the doctoral advisory committee must agree that the dissertation is ready for public defense. At least two weeks prior to the date of the defense, the candidate must provide the committee with copies of the nearly final dissertation and must ask the Associate Dean of Graduate Engineering Programs and Research to schedule the defense. For the defense to be satisfactory, the advisory committee members must agree that the dissertation defense has been successfully completed. If the candidate's defense is deemed unsatisfactory by only one member, the case will be referred to the Associate Dean of the Graduate Engineering Program and Research for appropriate action.

Additional Requirements

The student must satisfactorily complete the courses listed in the doctoral plan of study with a 3.0/4.0 or better cumulative GPA. One grade of "F" or more than one grade of "C" grade may be grounds for dismissal from the program pending recommendation of the doctoral advisory committee. Grades received from a dissertation are passed/failed, and do not count towards the GPA.

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.

Candidates must be registered for a minimum of two semester hours every semester during their candidacy including the semester in which the dissertation is defended. Students are expected to complete the dissertation requirements for the doctoral degree within five years after the candidacy examination has been passed.

Any other specific requirements and sequences leading to these degrees are described in the following sections or in departmental and program documents.

AEROSPACE ENGINEERING (AEE)

Glen E. Johnson,
Chair of the Department

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 department chair.

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 department chair.

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; numerical 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 maneuvers; transfers; rendezvous; groundtracks. Methods of orbit determination. Restricted three-body problem and introduction to artificial satellite theory. Prerequisites: 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. Prerequisites: 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. Prerequisites: 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. Prerequisite: 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 interpretation. 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. Prerequisite: 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)

Tony E. Saliba,
Chair of the Department

MASTER'S 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.

The program of study allows concentrations in:

Combustion
Environmental Engineering
Materials Engineering
Process Modeling and Control

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. Thermodymanics 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. Prerequisites: 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 550. AGITATION: Agitator design and scaleup for blending and motion, solids suspension, gas dispersion, and viscous operations; experimental, computational, and design tools of agitation; static mixing; and mixing with chemical reaction. Prerequisite: CME 412 or consent of instructor. *3 sem. hrs.*

CME 562. PHYSICAL AND CHEMICAL WASTEWATER TREATMENT PROCESSES: The design of physical and chemical unit processes to treat wastewater originating primarily from domestic and industrial sources. Industry pretreatment technologies and the basis for their development. Prerequisites: CHM 123 and CME 411 or consent of instructor. *3 sem. hrs.*

CME 563. HAZARDOUS WASTE ENGINEERING: Fundamental principles in the design and operation of hazardous waste remediation processes. Characterizing contaminated sites and conducting treatability studies for the selection of the most appropriate remediation strategy. Prerequisites: CHM 123 and CME 411 or consent of instructor. *3 sem. hrs.*

CME 564. SOLID WASTE ENGINEERING: Characterizing solid waste. Managing solid waste collection, transport, minimization, and recycling. Prerequisites: CHM 123 and CME 411 or consent of instructor. *3 sem. hrs.*

CME 574. FUNDAMENTALS OF AIR POLLUTION ENGINEERING I: Air pollution; combustion fundamentals; pollutant formation and control in combustion; pollutant formation and control methods in internal combustion engines; particle formation in combustion. Prerequisites: CME 305 or MEE 301, 302; CME 324 or MEE 410; or consent of instructor. *3 sem. hrs.*

CME 575. FUNDAMENTALS OF AIR POLLUTION ENGINEERING II: Review of the concepts of air pollution engineering; aerosols; removal of particles from gas streams; removal of gaseous pollutants from effluent streams; optimal air pollution control strategies. Prerequisites: CME 574 or consent of instructor. *3 sem. hrs.*

CME 576. ENVIRONMENTAL ENGINEERING SEPARATION PROCESSES: Discussion of the unit operations associated with environmental engineering separation processes of solid-liquid, liquid-liquid, and gas-liquid systems; general use, principles of operation, and design procedures for specific types of equipment. Prerequisite: consent of instructor. *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)

Joseph E. Saliba
Chair of the Department

MASTER'S 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 thesis (CIE 599). Upon request of the student, and with the approval of the faculty advisor and the department chair, the six thesis hours may be replaced with six hours of coursework plus three hours of project (CIE 598). A final oral examination is required upon completion of the thesis or project.

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. Prerequisite: 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 508. DESIGN OF TIMBER STRUCTURES: Study of basic wood properties and design considerations. Design and behavior of wood connectors, fasteners, beams, columns, and beam columns. Introduction to plywood and glued laminated members. Analysis and design of structural diaphragms and shear walls. Prerequisite: CIE 316. *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. Prerequisite: 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. WASTEWATER ENGINEERING: Predicting and measuring the characteristics and quantity of wastewater produced from domestic and industrial sources. Principles in designing and operating wastewater treatment plants that primarily use microbiological treatment processes. Process selection criteria will be emphasized. *3 sem. hrs.*

CIE 562. PHYSICAL AND CHEMICAL WASTEWATER TREATMENT PROCESSES: The design of physical and chemical unit processes to treat wastewater originating primarily from industrial sources. Industry pretreatment technologies and the basis for their development will be investigated. *3 sem. hrs.*

CIE 563. HAZARDOUS WASTE ENGINEERING: The fundamental principles of the design and operation of hazardous waste remediation processes. Characterizing contaminated sites and conducting treatability studies for the selection of the most appropriate remediation strategy. *3 sem. hrs.*

CIE 564. SOLID WASTE ENGINEERING: Characterizing solid waste. Managing solid waste collection, transport, minimization, and recycling. The design of solid waste disposal and resource recovery facilities. *3 sem. hrs.*

CIE 565. ENVIRONMENTAL CHEMISTRY: Basic principles of safety engineering, environmental health, and partitioning and transformation of pollutants in the environment. Basic environmental analytical methodology including pollutant characterization and microbiological quantity and activity measurements. *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 584. OPEN CHANNEL HYDRAULICS: Open channel flow in its various forms will be studied. Major topics to be covered include energy and momentum principles, uniform and gradually varied flow, rapidly varied flow, spatially varied flow, and unsteady flow. Pragmatic applications such as channel design, water surface profile computations, and culvert analysis will also be covered. Well-established solution approaches and widely accepted computer methods will be used to solve real-world problems. *3 sem. hrs.*

CIE 590. SELECTED READINGS IN CIVIL ENGINEERING: 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*

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. *1-6 sem. hrs.*

CIE 598. PROJECT *1-6 sem. hrs. each*

CIE 599. THESIS *1-6 sem. hrs.*

ENGINEERING MECHANICS (EGM)

Joseph E. Saliba
Chair of the Department

MASTER'S 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. Prerequisite: EGM 303, 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. Prerequisites: 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 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, 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. Prerequisite: 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 598. PROJECT *1-6 sem. hrs.*

EGM 599. THESIS *3-6 sem. hrs.*

Department of

ELECTRICAL & COMPUTER ENGINEERING (ECE)

Mohammad A. Karim,
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 503. Random Processes
   - ELE 506. Solid State Devices
   - ELE 507. Electromagnetic Fields I
   - ELE 509. Analysis of Linear Systems
3. Nine hours in a specialization area approved by the advisor.
4. Six hours on an approved thesis or six hours of additional electrical engineering course work. Graduate Assistants must use the thesis option.

See also the Master's Degree Regulations in the introductory section of this chapter. Specific course requirements are listed in the Electrical and Computer Engineering department graduate brochure.

COURSES OF INSTRUCTION

ELE 501. CONTEMPORARY DIGITAL SYSTEMS: Introduction to sequential logic; state machines; high-performance digital systems: theory and application of modern design; alternative implementation forms and introduction to HDL; productivity, recurring and non-recurring costs, flexibility, and testability; software drivers; hardware/software integration. Prerequisite: ELE 215 or equivalent. *3 sem. hrs.*

ELE 503. RANDOM PROCESSES: An introduction to random variables and processes as applied to system theory, communications, signal processing and controls. Topics include probability, random variables and processes, autocorrelation, power spectral density and linear system theory with random inputs. Applications in filtering and estimation. Prerequisites: ELE 202 and ELE 211 or equivalent. *3 sem. hrs.*

ELE 506. SOLID STATE DEVICES: Introduction to the theory of solid state devices; energy band theory; bulk properties of semiconductors; p-n junction, bipolar junction transistor, metal-oxide semiconductor (MOS), MOS capacitor, MOS field-effect transistor-theory, devices, modeling and applications. Prerequisite: ELE 301 or equivalent. *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 509. ANALYSIS OF LINEAR SYSTEMS: Signals, Systems, Orthogonal Decomposition, Fourier Analysis, Laplace Transforms, Z-Transforms, State Variables, and their application to the analysis of linear systems. *3 sem. hrs.*

ELE 510. MICROWAVE ENGINEERING: Microwave transmission, planar transmission lines, microwave components and filters. 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; broadband and frequency independent antennas; aperture and reflector antennas; applications to radar and communication systems. Prerequisite: ELE 442 or equivalent. *3 sem. hrs.*

ELE 516. ELECTROMAGNETIC COMPATIBILITY: Fundamental principles of electromagnetic compatibility (EMC) including nonideal behavior of components; radiated emissions and susceptibility; crosstalk; shielding and grounding; electrostatic discharge; system design for EMC. Prerequisite: undergraduate electromagnetics. *3 sem. hrs.*

ELE 518. ELECTROMAGNETIC FIELDS II: Classification and construction of solutions. Plane cylindrical and spherical wave functions. Integral equations, mathematical theory of diffraction. Green's function. Prerequisite: ELE 507. *3 sem. hrs.*

ELE 521. COMMUNICATION THEORY: 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 401 or equivalent, ELE 503. *3 sem. hrs.*

ELE 522. DIGITAL COMMUNICATION: 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 521. *3 sem. hrs.*

ELE 523. SPREAD SPECTRUM SYSTEMS: Fundamentals of Spread Sprectrum communication systems; direct sequence, pseudonoise, frequency hopping, time hopping modulation techniques; signal detection techniques; comparative analysis; applications. Prerequistite: ELE 521. *3 sem. hrs.*

ELE 533. COMPUTER DESIGN: Design considerations of the computer; register transfer operations; hardware implementation of arithmetic processors and ALU; instruction set format and design and its effect on the internal microengine; hardware and microprogrammed control design; comparative architectures. Prerequisite: ELE 501 or equivalent. *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. Prerequisites: ELE 314 or equivalent and ELE 501. *3 sem. hrs.*

ELE 537. ADVANCED ENGINEERING SOFTWARE: Concepts, implementation and current practice in the utilization of programming capabilities contained in operating systems. Introduction to operating system calls. A practical approach emphasizing theory and principles together with case studies and implementations in engineering applications of modern operating systems. Prerequisite: C programming experience. *3 sem. hrs.*

ELE 538. OBJECT-ORIENTED PROGRAMMING APPLICATIONS: A semi-formal approach to the engineering applications of object-oriented programming. Application of the concepts of classes, inheritance, polymorphism in engineering problems. Introduction to the use of class libraries. Effective integration of the concepts of application programmer interfaces, language features and class libraries. Prerequisite: C programming experience. *3 sem. hrs.*

ELE 541. POWER ELECTRONICS: Power switching devices including diodes, thyristors, triacs, BJTs, and MOSFETs. Power electronic converters, power amplification, power regulation and power conversion control. *3 sem. hrs.*

ELE 542. ELECTRICAL MACHINES AND CONTROL: Generalized analysis of electrical machines. Transient solution of nonlinear, time-varying machine equations. Reference frame theory. Induction machines. Brushless DC machines. Stepper motors. Control of ac and dc machines. Prerequisite: ELE 414 or equivalent. *3 sem. hrs.*

ELE 545. AUTOMATIC CONTROL: Analog and Digital Control System Design. Analysis and synthesis of feedback control systems. Performance and stability analysis. Regulator and servomechanism design: time and frequency domain methods. State-space methods: SVF design and observers. Digital implementation issues. Prerequisite: ELE 509. *3 sem. hrs.*

ELE 546. INSTRUMENTATION DESIGN: Theory of measurements: errors, accuracy, precision and bias. Analysis of measuring devices for various physical quantities such as motion, dimension, force, pressure and flow. Computer-aided experimentation. Automated data collection, recording, transmission and analysis. Virtual instrument design. *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 and ELE 414. *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 556. SYSTEMS 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 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 design and analysis, and fast Fourier transform processing techniques. Prerequisite: ELE 509. *3 sem. hrs.*

ELE 562. DIGITAL SIGNAL PROCESSING II: A study of the architectural requirements for one-dimensional digital signal processing. This includes the techniques for the design of both hardware and software elements needed for implementation of digital signal processors as well as application of those processors. Prerequisite: ELE 561. *3 sem. hrs.*

ELE 563. IMAGE PROCESSING: An introduction to image processing including the human visual system, image formats, two-dimensional transforms, image restoration, and image reconstruction. Prerequisite: ELE 561. *3 sem. hrs.*

ELE 572. LINEAR SYSTEMS AND FOURIER OPTICS: Mathematical techniques pertaining to linear systems theory; Fresnel and Fraunhoffer diffraction; Fourier transform properties of lenses; frequency analysis of optical systems, spatial filtering, application such as optical information processing and holography. Prerequisite: Acceptance into the EE graduate program or permission of the department chair. *3 sem. hrs.*

ELE 573. ELECTRO-OPTICAL DEVICES & 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: ELE 507, or permission of the department chair. *3 sem. hrs.*

ELE 574. GUIDED-WAVE OPTICS: Light propagation in slab and cylindrical waveguides; signal degradation in optical fibers; optical sources, detectors, and receivers; coupling; transmission link analysis; fiber fabrication and cabling; fiber sensor system. Prerequisite: ELE 507 or permission of the department chair. *3 sem. hrs.*

ELE 575. ELECTRO-OPTICS SENSORS: Optical sensors, including amplitude, phase, wavelength, polarization and modal interference based sensors. Photoelasticity effects in stressed optical materials. Quadrature point stabilization, linearity, dynamic range and sensitivity. Modulation and demodulation by both passive and active means. General sensor characteristics. Optical sources and detectors, optical signal-to-noise ratio analysis and general sensor characteristics. Fiber optic sensors and smart skin/structure technology. Prerequisite: ELE 574 or permission of the department chair. *3 sem. hrs.*

ELE 577L. ELECTRO-OPTICS LABORATORY: Experimentation with E-O systems emphasizing areas such as display technology, surveilance systems and components, and other disciplines in which electronic and optical elements are arranged to interact synergistically. *1 sem. hr.*

ELE 595. SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING: Particular assignments to be arranged and approved by the department chair. *2-6 sem. hrs.*

ELE 599. THESIS: *1-6 SEM. HRS.*

ELE 603. APPLIED OPTIMAL ESTIMATION: Random processes and state-space analysis. Applied optimal estimation with emphasis on Kalman and Weiner filtering. Prerequisite: ELE 503, ELE 545 or equivalent. *3 sem. hrs.*

ELE 611. ADVANCED ANTENNA THEORY: Advanced topics in antennas including advanced arrays, antenna temperature, synthetic apertures, aperture antennas, microwave traveling wave antennas. Prerequisites: ELE 507 and ELE 511. *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. RCS of antennas. Application of the physical theory of diffraction and the geometrical theory of diffraction to scattering problems. Prerequisites: ELE 507 and ELE 511. *3 sem. hrs.*

ELE 615. COMPUTATIONAL ELECTROMAGNETICS: This course deals with both the differential equation and integral equation based methods to solve Maxwell's equations for complex bodies. Methods studied include the Moment Method, Finite Element Method, and Finite Difference Time Domain Method. The course also deals with asymptotic techniques leading to the formulation to the GTD and PTD. Prerequisites: ELE 507 and ELE 518. *3 sem. hrs.*

ELE 631. MICROELECTRONICS SYSTEMS: Introduction to the design and application of engineering microelectronics; bipolar and MOS device theory and processing technology; CMOS logic and circuitry; design principles fundamental to chip design and fabrication; case studies employing introduction to HDL. Prerequisite: ELE 536. *3 sem. hrs.*

ELE 636. ADVANCED COMPUTER ARCHITECTURE: Comparative evaluation of advanced and experimental computer structures. Investigation of optical, multiprocessor, array, various hybrid and neural network architectures. This is an advanced seminar class using current computer design and experimental literature. Prerequisite: ELE 536. *3 sem. hrs.*

ELE 637. CONCURRENT PROCESSING: Introduction to the concepts and practices of parallel processing and

concurrency. Multiprogramming and multitasking. Synchronous and asynchronous events. Critical sections, mutexes and semaphores. Use of shared memory in engineering applications. Atomicity on CISC and RISC machines. Applications of interval timers. Case studies in engineering applications. Prerequisites: ELE 537 and ELE 636 or equivalent. *3 sem. hrs.*

ELE 641. NONLINEAR CONTROL: A study of the major techniques of nonlinear system analysis including phase plane analysis, describing function analysis and Lyapunov Stability Theory. Application of the analytical techniques to control system design including feedback linearization, sliding mode control and an introduction to adaptive control. Prerequisites: ELE 509 and ELE 545. *3 sem. hrs.*

ELE 642. OPTIMAL CONTROL AND ESTIMATION: Optimal control of discrete-time systems. Cost-equivalent control of continuous-time systems. Optimal estimation. Prerequisites: ELE 517 and ELE 545. *3 sem. hrs.*

ELE 661. STATISTICAL SIGNAL PROCESSING: This course studies discrete methods of linear estimation theory. Topics include random vector, linear transformations, linear estimation, optimal filtering, linear prediction, and spectrum estimation. Prerequisite: ELE 561. *3 sem. hrs.*

ELE 662. ADAPTIVE SIGNAL PROCESSING: An overview of the theory, design, and implementation of adaptive signal processors. This includes discussions of various gradient search techniques, filter structures, and applications. An introduction to neural networks is also included. Prerequisite: ELE 661. *3 sem. hrs.*

ELE 663. STATISTICAL PATTERN RECOGNITION: This course provides a comprehensive treatment of the statistical pattern recognition problem. The mathematical models describing these problems and the mathematical tools necessary for solving them are covered in detail. Prerequisite: ELE 661. *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 676. QUANTUM ELECTRONICS: Principles of the quantum theory of electron and photon processes; interaction of electromagnetic radiation and matter; applications to solid state and semiconductor laser systems. Prerequisite: ELE 506, or EOP 506/ELE 573 or equivalent. *3 sem. hrs.*

ELE 690. SELECTED READINGS IN ELECTRICAL ENGINEEERING: Directed Readings in electrical engineering areas to be arranged and approved by the chair of the student's doctoral advisory committee and the department chair. *1-3 sem. hrs.*

ELE 695. SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING: Special topics in electrical engineering not covered in regular courses. Course sections arranged and approved by the chair of the student's doctoral advisory committee and the department chair. *1-3 sem. hrs.*

ELE 698. D.E. DISSERTATION: An original investigation as applied to electrical engineering practice. Results must be of sufficient importance to merit publication. *1-15 sem. hrs.*

ELE 699. Ph.D. DISSERTATION: An original research 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 electo-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 Electo-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 higher, or equivalent, 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 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, 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: 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.*

EOP 513. LINEAR SYSTEMS AND FOURIER OPTICS: Mathematical techniques pertaining to linear systems theory; Fresnel and Fraunhoffer 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: Arithmetic and recognition using analog optics; number representations; modified signed-digit and residue arithmetic; logic minimization; Fredkin and threshold logic; combinational and sequential arithmetic units; shadow-casting and symbolic substitution; matrix processing; optical computing devices. 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 534. ELECTRO-OPTIC SENSORS: Optical sensors including amplitude, phase, wavelength, polarization, and modal interference based sensors. Photoelasticity effects in stressed optical materials. Quadrature point stabilization, linearity, dynamic range and sensitivity. Modulation and demodulation by both passive and active means. General sensor characteristics. Optical sources and detectors, optical signal-to-noise ratio analysis and general sensor characteristics. Fiber optic sensors and smart skin/structure technology. Prerequisite: EOP 514 or permission of the program director. *3 sem. hrs.*

EOP 541L. GEOMETRIC AND PHYSICAL OPTICS LABORATORY: Geometrical optics; characterization of optical elements; diffraction; interference; birefringence and polarization. Prerequisite: EOP 501 or permission of the program director. *1 sem. hr.*

EOP 542L. ELECTRO-OPTIC SYSTEMS LABORATORY: Fiber optic principles and systems: numerical aperture, loss, dispersion, single and multimode fibers, communications and sensing systems. Project oriented investigations of electro-fiber-optic systems and devices in general: sources, detectors, image processing, sensor instrumentation and integration, electro-optic component, display technology, nonlinear optical devices and systems. Prerequisite: EOP 514 or permission of the program director. *1 sem. hr.*

EOP 543L. ADVANCED ELECTRO-OPTICS LABORATORY: Project-oriented investigations of laser characterization, interferometry, holography, optical pattern recognition and spectroscopy. Emphasis is on the applications of optics, electronics, and computer data acquisition and analysis to measurement problems. Prerequisite: EOP 541L or permission of the 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. Prerequisite: EOP 513 or permission of the program director. *3 sem. hrs.*

EOP 624. NONLINEAR OPTICS: Introduction and overview nonlinear optical interactions, classical and harmonic oscillator model, symmetry properties of nonlinear susceptibility tensor, coupled-mode formalism, sum- and difference- frequency generation, parametric oscillators, four-wave mixing, phase conjugation, optical solitons, stimulated Brillouin and Raman scattering, photorefractive effect, and resonant nonlinearities. Prerequisite: EOP 502 or equivalent. *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 626: QUANTUM ELECTRONICS: Principals of the quantum theory of electron and photon processes; interaction of electromagnetic radiation and matter; applications to solid state and semiconductor laser systems. Prerequisites: ELE 506 or EOP 506/ELE 573, or equivalent. *3 sem. hrs.*

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,
Program Director and
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

MASTER'S 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 any field of engineering.
3. Nine hours of electives to include MSC 500 and MSC 501 or equivalent courses or demonstrated knowledge of the subject, and approved by the advisor and the chair.

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 SYSTEMS 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, stochastic inventory models, 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, depreciation analysis, 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. Prequisite: MSC 500 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 and ENM or MSC 522. *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 knowl-

edge 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/MSC 575 and ENM/MSC 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 committee, 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, Chair

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 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 include applied mathematics, artificial intelligence, business administration, computer science, educational administration, engineering, human factors, manufacturing, and public administration.
3. Nine semester hours of electives to include MSC 500 and MSC 501 or equivalent courses or demonstrated knowledge of the subject, and approved by the advisor and the chair.

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, stochastic inventory models, 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. Prerequisites: MSC or ENM 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. Prerequisite: 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. QUEUING THEORY AND APPLICATION: Emphasis on application of queuing 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, redundance, 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 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 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/MSC 575 and ENM/MSC 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 six 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 OF MATERIALS ANALYSIS: Fundamentals and applications of the traditional analytical methods such as x-ray analysis, electron microprobe, and scanning microscopy. Techniques such as NMR, atomic absorption, Raman, Mossbauer, and field ion microscopy 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. Prerequisite: 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. Anistotropy. Magneto-striction, 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, crystalline 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 of 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 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 modelling. Prerequisite: MAT 560. *3 sem. hrs.*

MAT 570. FRACTURE MECHANICS: Application of principles of fracture mechanics to fatigue and fracture in engineering structures. Prerequisite: MAT 506 or consent of instructor. *3 sem. hrs.*

MAT 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: 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. Prerequisite: 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

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: 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 518. PHASE CHANGE HEAT TRANSFER AND INTERFACIAL PHENOMENA: Interfacial thermodynamics of liquid-vapor-solid systems; surface wetting statics and dynamics; interfacial and phase stability; homogeneous and heterogeneous nucleation; and boiling heat transfer. Application to liquid-vapor phase change. *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. Prerequisites: 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 or 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. Prerequisite: 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, 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.*

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 (E) 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. Results must be of sufficient importance to merit publication. *1-15 sem. hrs.*

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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

BAER, Janine T. (1994), *Health and Sport Science,* Associate Professor — B.S., Mount Mary College, WI, 1983; M.S., Virginia Polytechnic Institute & State U., 1985; Ph.D., 1988.

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., The Ohio State University, 1973.

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.

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.

FIRST, Patricia F. (1995), *Educational Administration,* Professor— B.S., University of Massachusetts, Amherst, 1965; M.S., Illinois State University, 1976; Ed.D., 1979.

FRERICKS, Donald J. (1978), *Educational Administration,* Associate Professor—B.S., University of Dayton, 1956; M.A., Miami University, 1958; Ph.D., The Ohio State University, 1970.

FUCHS, Gordon E. (1967), *Teacher Education,* Professor—B.S., University of Wisconsin, 1958; M.S., 1961; Ph.D., The Ohio State University, 1974.

GEIGER, John 0. (1970), *Teacher Education,* Professor— B.A., Marquette University, 1966; Ph.D., 1972.

GIEBELHAUS, Carmen R. (1994), *Teacher Education,* Assistant Professor— B.A., University of Colorado, 1972; M.A., 1974; Ph.D., The Ohio State University 1993.

HART, Patricia M. (1989), *Teacher Education,* Associate Professor—B.S., University of Dayton, 1973; M.S., 1983; Ph.D., The Ohio State University, 1989.

HUNN, Diana M. (1992), *Teacher Education,* Associate Professor—B.S., Miami University, 1972; M.Ed., 1973; Ph.D., Indiana University, 1986.

HUNT, Thomas C. (1996), *Educational Administration,* Professor — B.A., Loras College, 1952; M.A., The Catholic University of America, 1956; Ph.D., University of Wisconsin (Madison), 1971.

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., The Ohio State University, 1969; M.A., 1972; Ph.D., 1978.

LAUBACH, Lloyd L. (1980), *Health and Sport Science,* Associate Professor —B.S., Central State University, Edmond, Oklahoma, 1961; M.S., University of Oregon, 1962; Ph.D., The Ohio State University, 1970.

LOSITO, William F. (1994), *Teacher Education,* Professor, — B.A., University of Dayton, 1964; Ph.D., Indiana University, 1973.

MATCZYNSKI, Thomas J. (1987), *Educational Administration,* Professor—B.S., University of Dayton, 1964; M.Ed., 1968; Ph.D., Ohio University, 1971.

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.

OLDENSKI, Thomas E., S.M. (1994), *Educational Administration,* Assistant Professor, — B.S., The University of Dayton, 1972; M.Ed., Boston College, 1975; M.A., Western Michigan University, 1978; Ed.S., The University of Dayton, 1984; Ph.D., Miami University (Ohio), 1994.

PLACE, A. William (1994), *Educational Administration,* Associate Professor, — B.S., The University of Dayton, 1976; M.S., 1980; Ph.D., The Ohio State University, 1988.

RAISCH, C. Daniel (1991), *Educational Administration,* Associate Professor—B.S., Wilmington College, 1961; M.A., Wittenberg University, 1966; Ph.D., Miami University, 1973.

ROGUS, Joseph F. (1981), *Educational Administration,* Professor — B.S., University of Dayton, 1960; M.Ed., Miami University, 1962; Ph.D., Ohio University, 1968.

ROWLEY, James B. (1989), *Teacher Education,* Associate 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.

RUSSO, Charles J. (1996), *Educational Administration,* Professor — B.A., St. John's University, 1972; M. Div., Seminary of Immaculate Conception, 1978; J.D., St. John's, 1983; Ed.D., 1989.

SCHLEPPI, John R. (1963), *Health and Sport Science,* Professor —B.S., The Ohio State University, 1961; M.B.A., 1963; Ph.D., 1972.

SUDZINA, Mary R. (1988), *Teacher Education,* Associate Professor—B.S., Virginia Commonwealth University, 1970; M.A., Villanova University, 1974; Ph.D., Temple University, 1987.

TALBERT-JOHNSON, Carolyn (1991), *Teacher Education,* Associate Professor—B.A., Ohio Dominican College, 1976; M.A., The Ohio State University, 1978; Ph.D., 1991.

TILLMAN, Beverly A. (1990), *Teacher Education,* Associate Professor, — B.S., Miami University (Ohio), 1974; M.A., The University of Michigan, 1975; Ph.D., The Ohio State University, 1992.

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WATRAS, Joseph (1979), *Teacher Education,* Professor—B.A., Boston University, 1965; M.Ed., University of Hawaii, 1969; Ph.D., The Ohio State University, 1972.

WEAVER, Roberta B. (1978), *Teacher Education,* Associate Professor—B.Sc. in Ed., The Ohio State University, 1960; M.Sc., in Ed., University of Cincinnati, 1966; Ed.D., 1982.

ZAHNER, Mary A. (1982), *Teacher Education,* Associate Professor—B.F.A., Ohio University, 1960; M.A., 1969; Ph.D., The Ohio State University, 1987.

ENGINEERING GRADUATE FACULTY

ATIQUZZAMAN, Mohammed (1997), *Electrical & Computer Engineering*, Associate Professor — B.Sc., Bangladesh University of Engineering & Technology, 1982; M.Sc., University of Manchester, 1984; Ph.D., University of Manchester, 1987.

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 and Environmental 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.

BROCKMAN, Robert A. (1984), *Mechanical and Aerospace Engineering*, 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.

CHASE, Donald V. (1993), *Civil and Environmental Engineering and Engineering Mechanics*, Assistant Professor — B.S., University of Kentucky, 1985; M.S. 1989; Ph.D., 1993; Reg. Prof. Engr.

CHUANG, Henry N. (1965), *Mechanical and Aerospace 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 and Computer Engineering*, Assistant Professor,—B.S., University of Strathclyde, 1979; Ph.D.,1982.

DEEP, Ronald (1989), *Engineering Management and Systems*. Professor—B.S., U.S. Air Force Academy, 1960; M.S.E., Purdue University, 1970; Ph.D., Florida State University, 1976; Reg. Prof. Engr.

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EBELING, Charles E. (1988), *Engineering Management and Systems*, Professor—B.S., University of Pittsburgh, 1965; M.S., Air Force Institute of Technology, 1969; Ph.D., The Ohio State University, 1973; Reg. Prof. Engr.

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HALLINAN, Kevin P. (1988), *Mechanical and Aerospace Engineering*, Associate Professor—B.S. University of Akron, 1982; M.S. Purdue University, 1984; Ph.D., Johns Hopkins University, 1988.

HARDIE, Russell C.(1993), *Electrical and Computer Engineering,* Assistant Professor — B.E.S. Loyola College, 1988; M.E.E., University of Delaware, 1990; Ph.D., 1992.

HARMER, Richard S. (1971), *Mechanical and Aerospace Engineering,* Associate Professor—B.S., University of Illinois, 1963; M.S., 1967; Ph.D.,1971.

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HECHT, Norman L. (1963), *Materials Engineering,* Professor—B.S. Ceramic Engineering, Alfred University, 1960; M.S. Ceramic Science, State University of New York, 1968; Ph.D. , 1972.

JAIN, Vinod K. (1979), *Mechanical and Aerospace Engineering,* Professor—B. S.M .E., University of Roorkee, India, 1964; M.S.M.E.,1970; Ph.D., Iowa State University of Science and Technology, 1980.

JOHN, Reji (1993), *Materials Engineering,* Associate Professor — B. Tech., Indian Institute of Technology, India, 1982; Ph.D., Northwestern University, 1988.

JOHNSON, Glen E. (1993), *Mechanical and Aerospace Engineering,* Professor — B.S., Worcester Polytechnic Institute, 1973; M.S., Georgia Institute of Technology, 1974; Ph.D., Vanderbilt University, 1978; Reg. Prof. Engr.

KARIM, Mohammad A. (1986), *Electrical and Computer Engineering and Electro-Optics,* Professor—B.S., Physics, University of Dacca, Bangladesh, 1976; M.S. Physics, University of Alabama, 1978; M.S.E.E., 1980; Ph.D.,1982.

KASHANI, A. Reza (1994), *Mechanical and Aerospace Engineering,* Associate Professor-B.Sc., Sharif University of Technology, 1977; M.Sc., University of Wisconsin-Madison, 1979; Ph.D., 1989.

KISSOCK, John Kelly (1995), *Mechanical and Aerospace Engineering,* Assistant Professor-B.S.M.E., University of Colorado, 1982; M.S., Washington University, 1989; Ph.D., Texas A&M University, 1993.

KOH, Seungug (1996), *Electrical and Computer Engineering,* Assistant Professor — B.S., Physics, Korea University, 1988; M.S., Applied Optics, Rose-Hulamn Institute of Technology, 1990; Ph.D., Computer Engineering, University of Cincinnati, 1994.

KUMAR, Binod (1980), *Materials Engineering,* Associate Professor, (1993) *Electro-Optics,* Associate Professor — B.S., Banaras Hindu University, India, 1967; M.S., Penn State University, 1973; Ph.D., 1976.

LEE, C. William (1982), *Chemical Engineering,* Professor—B.S., National Taiwan University, 1976; M.S., University of Akron, 1979; Ph.D., The Ohio State University, 1982.

LESTINGI, Joseph F. (1992), *Mechanical and Aerospace Engineering,* Professor — B.C.E., Manhattan College, 1957; M.S., Virginia Polytechnic Institute, 1959; D. Eng., Yale University, 1966; Reg. Prof. Engr.

LIGHTMAN, Allan J. (1988), *Electro-Optics,* Associate Professor — B.A.Sc., University of Toronto, 1963; M.A., 1965; Ph.D., Weizmann Institute of Science, Rehovot, 1971.

LITTLE, Gordon R. (1988), *Electro-Optics,* Assistant Professor—B.S., The Ohio State University, 1966; M.S., 1970; Ph.D., 1973.

LOOMIS, John S. (1979), *Electro-Optics,* Professor—B.S., Case Institute of Technology, 1966; M.S., University of Illinois, 1968; M.S., University of Arizona, 1977; Ph.D., 1980.

LU, Chris C. (1976), *Chemical Engineering,* Associate Professor—B.S., Chen-Kung University at Taiwan, 1960; M.S., University of Missouri at Rolla, 1966; Ph.D., University of Texas. 1972.

MOON, Donald L. (1974), *Electrical and Computer Engineering and Electro-Optics,* Professor—B.S.E.E., West Virginia Institute of Technology, 1963; M.S.E.E., University of Toledo, 1966; Ph.D., The Ohio State University, 1974.

MURRAY, Paul T. (1975), *Materials Engineering,* Professor—B.S. Chemistry, University of Cincinnati, 1974; Ph.D. Chemical Physics, University of North Carolina, 1979.

MYERS, Kevin J. (1986), *Chemical Engineering,* Professor—B.Ch.E., University of Dayton, 1981; D.Sc., Washington University, 1986; Reg. Prof. Engr.

PASALA, Krishna M. (1984), *Electrical and Computer Engineering,* Professor—B.E., Andhra University, India, 1970; Ph.D., Indian Institute of Science, Bangalore, 1974.

PENNO, Robert P. (1987), *Electrical and Computer Engineering,* Assistant Professor — B.S.M.E., Rose Hulman Institute of Technology, 1971; M.S.E.E., 1984; Ph.D., University of Dayton, 1987.

PHILLIPS, Norman S. (1974), *Engineering Mechanics,* Professor—B.A.E., The Ohio State University, 1955; M.S.E., University of Dayton, 1968; M.S.Ed., 1983; Reg. Prof. Engr.

ROGERS, Dana B. (1982), *Electrical and Computer 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.

SAFFERMAN, Steven I. (1994), *Civil and Environmental Engineering and Engineering Mechanics,* Assistant Professor-B.S., University of Cincinnati, 1987; M.S. 1988; Ph.D., 1994.

SALIBA, Joseph (1980), *Civil and Environmental Engineering and Engineering Mechanics*, Professor—B.S., University of Dayton, 1979; M.S. 1980; Ph.D., 1983, Reg. Prof. Engr.

SALIBA, Tony E. (1986), *Chemical Engineering*, Professor—B.Ch.E., University of Dayton, 1981; M.S., 1982; Ph.D. 1986.

SANDHU, Sarwan S. (1980), *Chemical Engineering*, Professor — B.Sc., Panjab University, 1961; B.Sc.C.E., 1966; M.Sc., University of New Brunswick, 1970; D.I.C. Imperial College 1973; Ph.D., University of London, 1973.

SARGENT, Gordon A. (1985), *Mechanical and Aerospace Engineering*, Professor—B.Sc., Imperial College of Science and Technology, University of London, 1960; Ph.D., 1964.

SCARPINO, Frank A. (1987), *Electrical and Computer Engineering*, Associate Professor-B.S.E.E., University of Cincinnati, 1963; M.S.E.E., 1970; Ph.D., University of Dayton, 1987.

SCHAUER, John J. (1968), *Mechanical and Aerospace Engineering*, Professor—B.M.E., University of Dayton, 1958; M.S. Carnegie Institute of Technology, 1959; Ph.D., Stanford University, 1964.

SERVAIS Ronald A. (1974), *Chemical Engineering*, Professor — B.S.A.E., Parks College of St. Louis University, 1963; M.S., St. Louis University, 1966; D.Sc., Washington University, 1969; Reg. Prof. Engr.

SNIDE, James A. (1979), *Materials Engineering*, Professor — B.S.M.E., Ohio University, 1959; M.S., Air Force Institute of Technology, 1965; Ph.D., The Ohio State University, 1976.

SWEENEY, Patrick J. (1978), *Engineering Management*, Professor — B.S., University of Notre Dame, 1957; M.S., University of Missouri, 1967; Ph.D., University of Dayton, 1977; Reg. Prof. Engr.

TAYLOR, Philip H. (1988), *Electro-Optics*, Assistant Professor — B.S., State University College at Oneonta, 1980; Ph.D., Pennsylvania State University, 1984.

THEBERT PEELER, Deborah, (1992), *Materials Engineering*, Associate Professor — B.S. Metallurgical Engineering, Purdue University, 1977; M.S. Mechanical Engineering, University of Cincinnati, 1979; Salmon P. Chase College of Law, Northern Kentucky University, 1983; Ph.D. Materials Engineering, University of Dayton, 1992.

THIELE, Gary A. (1979), *Electrical and Computer Engineering*, F.M. Tait Professor—B.S., Purdue University, 1960; M.S., The Ohio State University, 1964; Ph.D.,1968; Reg. Prof. Engr.

THOMSON, Robert A. (1952), *Civil Engineering and Engineering Mechanics*, Professor Emeritus—B.S. in Ed., University of Dayton, 1950; B.M.E.,1954; Ph.D., Illinois Institute of Technology, 1985. Reg. Prof. Engr.

WEEKS, Thomas M.. (1977), *Aerospace Engineering*, Adjunct Professor—B.S.M.E., Syracuse University, 1958; M.S.M.E., The Ohio State University, 1965; Ph.D., Syracuse University, 1965.

WESTERKAMP, John J. (1986), *Electrical and Computer Engineering*, Associate Professor—B.E.E., University of Dayton, 1980; M.S.E.E., Purdue University, 1981; Ph.D., 1985.

WHITNEY, James M. (1991), *Civil and Environmental Engineering and Engineering Mechanics*. Professor — B.A. Sciences, Illinois College, 1959; MSTE, Georgia Institute of Technology, 1961; M.S. Engineering Mechanics, The Ohio State University, 1964; Ph.D., 1968.

WILLIAMSON, Tommy L. (1981), *Electrical and Computer Engineering and Electro-Optics*, Associate Professor —B.S.E.E., Ohio University, 1962; M.S.E.E., The Ohio State University, 1965; Ph.D., 1975.

WURST, John C. (1971), *Mechanical and Aerospace Engineering*, Professor Emeritus—B.M.E., University of Dayton, 1957; M.S.E.,1968; Ph.D., University of Illinois 1971; Reg. Prof. Engr.

ZOGHI, Manoochehr (1986), *Civil Engineering and Engineering Mechanics*, Associate Professor—B.S., University of Louisville, 1979; M.E., 1981; Ph.D., University of Cincinnati, 1988.

INDEX

Academic Information 15
Academic Year 3
Academic Standards 18
Accreditation 5
Administrative Structure 5
Admission 15
Aerospace Engineering (AEE) 95
Affirmation Action and Employee Development Office 12
Appeal 18
Application 15
Arts and Sciences, College of 21
Assistantships and Fellowships 8
Biology (BIO) 21
Business Administration (MBA) 53
Campus Ministry 6
Cancellation and Refunds 7
Center for International Programs 13
Chemical Engineering (CME) 98
Chemistry (CHM) 24
Civil Engineering (CIE) 99
Clinical Psychology 44
Columbus, Off-Campus Center 6
Communication (COM) 26
Communication Interdisciplinary 20
Comprehensive Examination 17
Computer Science (CPS) 30
Counselor Education and Human Services (EDC) 72
Degree Requirements, Specific (see appropriate subject)
Degrees Granted 15
Directories 121
Education, School of 65
Educational Administration (EDA) 75
Educational Specialist in Education Leadership (EDL) 78
Electrical Engineering (ELE) 103
Electro-Optics (EOP) 106
Engineering Mechanics Courses (EGM) 101
Engineering, School of 91
English (ENG) 33
Experimental-Human Factors Psychology 44
Faculty, College of Arts and Sciences 125
Faculty, Business Administration 128
Faculty, Education 130
Faculty, Engineering 132
Fees 7
Financial Information 7
Food Service 11
Foreign Language Requirements 17
General Psychology 45
Health and Sport Science 81
Health Services 12
Housing 11
Individual Interdisciplinary Programs 19
Institutional Memberships 5
Interdisciplinary Educational Studies 20
Interdisciplinary and Joint Studies 19
International Affairs 38
International Marian Research Institute 20
International Student Admission 16
Joint Studies 19
Libraries 9
Lima, Off-Campus Center 6
Management Science (MSC) 111
Marianists 3
Master of Science in Teaching 66
Materials Engineering (MAT) 113
Mathematics (MTH) 35
Mechanical Engineering (MEE) 116
Off-Campus Academic Centers 6
Parking 11
Philosophy (PHL) 37
Physics (PHY) 37
Political Science (POL) 38
Privacy Rights 13
Psychology (PSY) 42
Public Administration 39
Public Safety and Parking 11
Purpose, Statement of 3
Registration for Courses 17
Religious Studies (REL) 48
Research Institute 9
Residence Requirement 17
School Counseling 72
School Psychologist 66
Society of Mary 3
Student Identification Cards 11
Sufficient Progress 18
Teacher Education (EDT) 83
Theological Studies 48
Theses 17
Time Limit 18
Transcripts 8
Transfer Credits 17
Tuition 7
Veterans 16

The University of Dayton

CAMPUS MAP

1. Albert Emanuel Hall
2. Alumni Hall
3. Alumni House
4. Arcade
5. Ballard Building
6. Baujan Sports Field
7. Benisek Hall
8. Caldwell Street Center
9. Chaminade Hall
10. Children's Center
11. Eugene W. Kettering Engineering & Research Laboratories
12. Thomas J. Frericks Athletic and Convocation Center
13. Founders Hall
14. Garden Apartments
15. Gosiger Hall
16. Immaculate Conception Chapel
17. Irving Ave. Apartments
18. Jesse Phillips Humanities Center
19. John F. Kennedy Memorial Union
20. Joseph E. Keller Hall
21. Liberty Hall
22. Magin Building
23. Marycrest Hall
24. McGinnis Center
25. Mechanical Engineering Building
26. Miriam Hall
27. Music/Theatre Building
28. O'Reilly Hall
29. Physical Activities Center
30. Post Office
31. Power House
32. Reichard Hall
33. Residence Properties Maintenance Bldg.
34. Rike Center for Fine Arts
35. Roesch Library
36. Rudy's Fly-Buy
37. Sherman Hall
38. Shroyer Park Center
39. St. Joseph Hall
40. St. Mary Hall
41. Stuart Hall
42. The Campus South
43. UD Arena
44. Welcome Stadium
45. William S. Anderson Information Sciences Center
46. Wohlleben Hall
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